CLIMATE-INDUCED COMMUNITY RELOCATIONS:

CREATING AN ADAPTIVE GOVERNANCE FRAMEWORK BASED IN HUMAN RIGHTS

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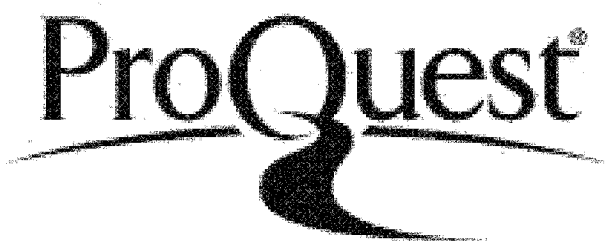

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ABSTRACT

The specter of millions of people fleeing their homes because of climate change has sparked an international debate about creating human rights protections for climate refugees. Though scholars and journalists have focused on the southern hemisphere, this crisis is occurring with unprecedented rapidity in the Arctic. In Alaska, temperatures have increased at twice the rate of the global average. Arctic sea ice is decreasing and permafrost is thawing, which is accelerating flooding and erosion. These environmental phenomena are threatening dozens of the 200 indigenous tribes that have inhabited the Alaskan Arctic for millennia. The traditional responses of hazard prevention and disaster relief are no longer protecting communities despite millions of dollars spent on erosion control and flood relief. Community relocation is the only feasible solution to permanently protect the inhabitants of these communities. This dissertation describes the steps that federal, state, and tribal governments have taken to relocate Newtok, Shishmaref and Kivalina, three indigenous communities located along the western coast of Alaska, that have chosen to relocate due to climate change. The policy and practical challenges to relocate these communities are enormous and clearly demonstrate that new governance institutions need to be designed and implemented to specifically respond to climate-induced relocation. This dissertation ultimately proposes the creation of Guiding Principles of Climigration outlining key human rights principles that can guide an adaptive governance framework. This framework, in turn, will allow government

agencies to dynamically transition their humanitarian response from protection in place to community relocation in these cases.

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I. GENERAL INTRODUCTION

The UN Framework Convention on Climate Change (UNFCCC) defines "climate change" as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (Houghton, 2001). Climate change is most often associated with temperature changes in the earth's atmosphere. Nine of the ten warmest years in the 132-year temperature record occurred during the 21st century. Only one year during the 20th century, 1998, was warmer than 2011, which tied with 1997 as the 11th warmest year on record since 1880 (NOAA, 2011). The warmest years on record were 2010 and 2005, which were 1.15 degrees F above average (NOAA, 2011).

These temperature changes impact the hydrosphere, cryosphere, atmosphere and biosphere and create numerous and diverse environmental changes. Extreme weather events and gradual biophysical transformation, such as drought or erosion, are often considered to be signals of climate-induced environmental change (Renaud et al., 2007; Ferris and Petz, 2012). These environmental processes, however, are part of natural climatic oscillations, which has made it more difficult to determine how climate change will impact these processes. In the Arctic, reduction in arctic sea ice extent is considered a signal of the impact of a warming climate. According to the National Snow and Ice Data Center (NSIDC), the six smallest arctic sea ice extents occurred between 2007 and

2012. The September 2012 arctic sea ice extent and thickness was the lowest on record (NSIDC, 2012).

In 1990, the Intergovernmental Panel on Climate Change stated that human migration may be the most severe consequence of climate change and predicted that 150 million people will be displaced by climate change by 2050 (IPCC, 1990). Sea level rise, floods, droughts and hurricanes are currently displacing hundreds of millions of people and threatening the lives, livelihoods, homes, health, and basic subsistence of human populations all over the world (IPCC, 2001; Stern, 2007; Ferris and Petz, 2012). Water and food security issues, due to drought and salt water intrusion, are also impacting the sustainability of communities (Foresight, 2011).

The collective impact of climate change challenges theoretical constructs developed to understand human migration and human rights, both based primarily on individual or household units of analysis. Research examining the nexus between environmental change and human mobility has primarily focused on the migration of individuals and households. Climate change is considered one of several factors causing migration making it difficult to isolate and demonstrate how climate change alone can affect migration (Bohra-Mishra and Massey, 2011; Foresight, 2011). Socio-economic dynamics create the difficulty in isolating climate or environment as a significant or exclusive factor that causes migration. Case studies that analyze the connection between drought and migration, for example, examine how population growth, household income, social networks and employment opportunities intertwine with climate factors as the

causes for migration. Migration is seen as one of many coping strategies to alleviate poverty (Kniveton et al., 2009; Foresight, 2011).

Similarly, case studies that examine mass population displacement caused by random environmental events, where communities are temporarily evacuated and infrastructure is rebuilt with the expectation that people will return home, focus on the migration patterns of individuals or households who choose not to return home. In some of these studies, researchers identify socioeconomic status as a factor that contributes to the migration decision, demonstrating the difficulty of segregating climate from other reasons that cause people to migrate (Kniveton et al., 2009).

In the United States, the federal government has issued numerous reports since 2003 documenting how climate change is impacting the habitability of Alaskan communities. In 2003, the US General Accounting Office found that flooding and erosion affect 184 out of 213 of Alaska Native villages and four of these communities planned to relocate due to these environmental threats. Six years later, the GAO issued a second report and found that erosion and flooding imminently threatened 31 Alaskan communities and 12 of these communities planned to relocate. State and federal government agencies are struggling to respond to the enormous new needs of these communities. Despite spending millions of dollars, the traditional methods of erosion control and flood protection have not been able to protect some communities. The inability of technology to protect people who reside in vulnerable risk-prone coastal and riverine communities is an issue that could affect millions of people all over the world. The recent devastation caused by Hurricane Sandy exemplifies these risks. The state

governments of New York and New Jersey are now evaluating whether rebuilding these coastal communities is possible and whether erosion and flood control infrastructure can protect these places in the future. This paper describes the Alaskan experience with these issues. For several Alaska Native communities protection in place is not possible and community relocation is the only adaptation strategy that can protect them from accelerating climate change impacts.

This dissertation focuses on the relocation of Newtok, a Yup'ik Eskimo community located along the Bering Sea in western Alaska, and Kivalina and Shishmaref, two Inupiaq Eskimo communities located north of Newtok on the coast of the Chuckchi Sea. Newtok lies at approximately 60.942780° North Latitude and 164.629440° West Longitude, Shishmaref lies at approximately 66.256670° North Latitude and -166.071940° West Longitude, and furthest north, Kivalina lies at approximately 67.726940° North Latitude and -164.533330° West Longitude (DCRA, 2012). . The primary focus of this dissertation is on Newtok's relocation because of these three communities it is the only one that is in the process of relocating and has constructed pioneer infrastructure at the relocation site. Kivalina and Shishmaref are still identifying a relocation site that meets the geophysical requirements of state and federal government agencies responsible for building community infrastructure, such as schools and airstrips. Chapter 3 analyzes the reasons for this distinction between communities.

Newtok's relocation presents a unique opportunity to study the nexus between climate-induced environmental change, community habitability and community relocation when no other factor is causing the displacement of the community.

Newtok's relocation also provides an opportunity to learn from the Newtok Planning Group, an ad hoc intergovernmental working group dedicated to Newtok's relocation.

Based on this research, my first proposition is that climate-induced erosion rather than social and economic factors will be the sole cause for permanent community displacement. Although this dissertation focuses on the relocation of indigenous communities, the research is relevant more broadly to community-based adaptation to climate change. The unit for analysis for this dissertation is the community. The term "community" means a unified group of individuals with common interests or characteristics, including by ethnicity or political interests, and are geographically co-located.

The relocation of entire communities, not just individuals and households, may, in some circumstances, be the best adaptation response to climate change. Relocation may be required because the community's current location is uninhabitable, or relocation may reduce vulnerability to future climate-induced environmental impacts that threaten people's lives and repeatedly damage or destroy life-dependent infrastructure. Relocation is a process whereby community residents and their housing, assets, and public infrastructure are reconstructed in another location (Abhas, 2010).

Newtok's relocation is unique for several reasons. First, the community has decided to relocate solely because of the climate-induced environmental changes which are causing the physical location of their community to become uninhabitable. The community's decision to relocate can not be attributed to any other social or economic reason. Climigration is the word I created to describe this type of permanent population

displacement when community relocation is required to protect community residents from climate-induced biophysical and ecological changes. No consensus exists on the terminology and definition to use to describe climate-induced population displacement (Bierman and Boas, 2010; Renaud et al., 2007; Docherty and Giannini, 2009). The impetus to create a new word to describe the climate-induced community relocations is to provide "greater conceptual clarity" regarding the type of human mobility which is the focus of this dissertation (Jacobsen and Landau, 2003).

Climigration is distinct from other patterns of human mobility because of the combination of three intersecting elements: permanent displacement, community-wide displacement and climate change. Climigration means that climate-induced ecological change may alter ecosystem services permanently, cause extensive damage to public infrastructure, repeatedly place people in danger and require community relocation.

My second proposition is that a community-led relocation process that protects the human rights of community members and integrates long-term sustainability will promote the resilience of the collective community, as well as that of its individual residents. Newtok's relocation creates a precedential model for a community-led relocation effort and presents the opportunity to examine this effort, which exemplifies the embedding of human rights principles in the relocation process and illustrates the right to self-determination through the collective decision to relocate. The Native Village of Newtok voted three times to relocate, believing that relocation is the only adaptation strategy that will protect the community from climate-induced environmental change. The Newtok Traditional Council, the sole local-level governing body for the community,

has been leading the relocation effort of approximately 25 federal, state and tribal governmental and non-governmental organizations. The Newtok Traditional Council along with community members is making all decisions related to the community relocation, including choosing the relocation site, the community lay-out plan and the identity of families that will be the first to reside at the relocation site.

Notions of fairness, justice and equity require that the human rights of those who have least contributed to climate change be protected. Climate change exacerbates existing inequities and injustices, including poverty, low socio-economic development, and unequal access to resources (Docherty and Giannini, 2009). These changes disproportionately impact arctic indigenous populations residing in geographically isolated and small communities (Trainor et al., 2007). Scientific consensus has established that fossil fuel use contributes to an increase in atmospheric temperatures, which is causing changes in the biosphere, cyrosphere and hydrosphere. These environmental changes are occurring more rapidly in the Arctic (Ford, 2009). In May 2012, atmospheric CO_2 concentration reached 400 parts per million (ppm) in the Arctic, an increase of 125 ppm above pre-industrial levels, a troubling milestone in the ongoing rise in anthropogenic greenhouse gases (NOAA, 2012). This CO_2 level is significant because many scientists believe that CO_2 levels should be no higher than 350 ppm in order to avoid severe and abrupt ecological changes (Rockstrom et al., 2009). The disproportionate warming that occurs in the Arctic mandates that the human rights of those affected by these changes be protected.

Community relocations are an extreme consequence of climate-induced environmental change and present an unprecedented challenge to governance institutions at local, regional and national levels. Severe economic, social, and environmental consequences can occur in the relocation process. Government-mandated relocation can unravel the fabric of a community, weaken community institutions and social networks, disrupt subsistence and economic systems, and impact the cultural identity and traditional kinship ties within a community (Smith, 2009). Further, the Global Facility for Disaster Reduction and Recovery (GFDRR) has determined that the failure to fully consider the welfare of the population and empower people of a community to make decisions regarding critical elements of a relocation, including site selection and community lay-out, are the principal reasons that relocations have been unsuccessful (Abhas, 2010). GFDRR is a partnership of 41 countries and 8 international organizations committed to helping developing countries reduce their vulnerability to natural hazards and adapt to climate change. If climate-induced environmental change renders entire communities uninhabitable, it is critical to understand how and if a community-led relocation can minimize these adverse effects and foster community resilience.

I propose that human rights principles should guide community relocations in order to avoid or minimize the adverse consequences associated with relocation and to foster the cultural and economic resilience of community residents and long-term sustainability of the community. Human rights principles are based on the fundamental freedoms inherent in human dignity (Moyn, 2010). These rights are defined as entitlements that transcend the sovereignty of nation state governments (Moyn, 2010).

Public dialogue is critical to the formulation and viability of human rights principles. Through an international public discourse, the objectivity and universality of the human right can be tested and affirmed (Sen, 2004). In order to be universal and merit a public ethical proclamation, the human right must "be owed by every political society to everybody" (Cohen, 2006). A human rights relocation framework recognizes the harm caused by climate-induced environmental changes and creates a moral and legal obligation to respond.

In this dissertation, I propose the creation of Guiding Principles of Climigration, which will create a common language to guide the international, national and local relocation response. These human rights principles will affirm and prioritize nation state governments' obligations to protect vulnerable populations from climate-induced displacement. Such principles will provide soft law human rights protections for climate-induced community relocation to ensure that the basic needs of relocated communities are met, the lives of residents protected and that non-discriminatory protection and assistance is provided (Kalin, 2001). Soft international law does not require nation state governments to consent and ratify a legally binding document. As a consequence, soft laws are sometimes preferable because they can provide human rights protections and international compliance without the negotiation of a treaty (Kalin, 2001).

At the time I started this research in 2007, the term "climate refugees" was commonly used to describe people displaced by climate change in order to advocate for human rights protections and humanitarian responses. My research began with a question regarding the term "climate refugee" and whether the term accurately describes

the type of displacement occurring in Alaska. This question led me to consider whether the refugee resettlement framework, which provides humanitarian assistance and human rights protections to individuals fleeing persecution and torture in their country of origin, will provide human rights protections to the Alaskan communities displaced by climate change. Working as an immigration attorney in Alaska since 1994 and appointed in 2003 as Alaska's first Refugee Resettlement Director, I wanted to learn more about the concept of climate refugees and analyze the intersection between those displaced by climate-induced environmental change and refugees displaced because of a well-founded fear of persecution. The latter group of refugees is provided protection and humanitarian assistance through the 1951 UN Convention Relating to the Status of Refugees (Hathaway, 1991).

Scholars using the term "environmental refugee" want to expand the traditional definition of "refugee" to include individuals fleeing environmental degradation so that they can have access to the same international structure of assistance and protection dedicated to refugee resettlement which ensures their safety and well-being despite their forced migration (Conisbee and Simmons, 2003). The term "environmental refugee", however, has met with much controversy (Black, 2001). Although there are similarities between the two groups of migrants, the most obvious being the forced nature of their flight and then their need for material assistance and permission to live elsewhere, there are also important differences. At the international level, the 1951 Convention Relating to the Status of Refugees is the only human rights treaty that provides an international framework to respond to the needs of refugees. Article 1 A(2) of the 1951 Convention

defines a refugee as a person who has a well-founded fear of persecution on account of race, religion, political opinion, national origin and membership in a social group (Hathaway, 1991).

Refugee doctrine does not adequately provide an appropriate response to the situation of climigration. Refugee doctrine is based on the fundamental principle that a person needs legal protection because they are outside of their country of origin due to persecution by a government actor or an actor the government cannot control (Hathaway, 1991). Refugees cannot turn to their own governments for protection because nation-states are often the source of their persecution. Refugees need international intervention to ensure there is safe refuge.

In the situation of displacement caused by climate change, communities may still be able to rely on national protection to respond to the humanitarian crisis. The majority of climigrants will migrate within their country of origin. Most significantly, persecution is not a contributing factor in a community's forced migration due to climate change. For these reasons, the international framework created by the 1951 United Nations Convention Relating to the Status of Refugees is not an appropriate solution to resolve the humanitarian crisis created by climigration.

In addition, no other human rights instruments, including the Universal Declaration of Human Rights, the Guiding Principles on Internal Displacement, and the Universal Declaration on the Rights of Indigenous Peoples, provides a theoretical basis for creating these principles. In addition, none of these legal documents addresses the complex and unique social, economic, and political crises of populations facing

climigration (Bronen, 2011). Newtok's relocation presents the opportunity to analyze the application of human rights principles to a community relocation process.

Finally, Newtok's relocation presents the opportunity to analyze relocation as a community-based adaptation strategy. The institutional humanitarian response to natural disasters provides an entry point to examine adaptation strategies to climate change that includes community relocations. Disasters occur when a natural hazard occurs and the local capacity to respond is exceeded and therefore affects the economic and social development of a community (Ferris and Petz, 2012). This definition integrates the concept that political and social-economic factors contribute to the vulnerability of individuals and communities, which cause a natural environmental event to become a disaster.

The increased number of disasters, coupled with the increased cost due to the damage and destruction of infrastructure and the loss of human life, have led to a focus on disaster risk reduction and prevention. Preventive relocation or resettlement of a community is one of the strategies being used to protect human populations from recurring natural hazards that threaten their lives (Correa et al., 2011). Newtok's relocation provides the opportunity to posit an adaptive governance response, which incorporates disaster relief reduction measures focused on protection in place at one end of a continuum and includes community relocation when there are no other feasible solutions to protect people's lives. While numerous studies have examined the legal, theoretical and individual dimensions of relocation, few have followed the relocation of a community on its own initiative. Most research documents the impact of community

relocations that have been mandated by government to foster development or geo-political objectives (Smith, 2009). In fact, there is almost no empirical evidence documenting a community-led relocation process. For these reasons, the community relocation of Newtok provides a tremendous opportunity to study in depth the relocation process.

I.1 Structure of Dissertation

Chapter 1 describes the methods that I used to conduct this research. Chapter 2 provides an in-depth description and analysis of Newtok's relocation process. Chapter 3 provides a cross-case study comparison of the relocation process occurring in Kivalina, Shishmaref and Newtok, all indigenous communities located in western Alaska. I chose to focus on these three communities because each of the communities has decided to relocate as the only means to provide them with long-term protection from climate-induced environmental changes. In the conclusion, I outline the steps that need to be taken at the local, national and international levels so that the human rights of displaced peoples will be protected when community relocation is the only adaptation strategy suitable for protecting their lives.

The appendices include two papers I wrote, which were published as a result of my participation with the United Nations University Institute for Environment and Human Security (UNU-EHS) Summer Academy during the summer of 2008. The Summer Academy's theme was Linking Environmental Change, Migration and Social Vulnerability. The first paper in the appendices was written in conjunction with this

event and provides a simple description of the human rights implications of climate-induced community relocations (Bronen, 2009).

The second paper published as a book chapter in a book titled *Environment, Forced Migration and Social Vulnerability*, was selected from a series of papers submitted as part of a conference, which occurred in October 2008, sponsored by the UN University Institute for Environment and Human Security (Bronen, 2010). This second paper also provides a simple depiction of the nexus between environmental change and human mobility in Alaska. Both papers rely on data gathered prior to June 2008, whereas the data that forms the basis for Chapters 2 and 3 of my thesis was gathered up until September 2012.

In addition, the two appendices were preliminary descriptions, not analyses, of the relocation issues in Alaska, intended to bring these to the attention of other students participating in the United Nations University Summer Academy discussions of climate-associated human rights issues (Bronen 2009) and scholars researching the connection between environmental change and human mobility (Bronen 2010). These descriptions set the stage for a thorough analysis of the human-rights consequences of climate-driven relocation efforts and institutional barriers applicable to Newtok's relocation (Chapter 2), the conception of an adaptive governance framework to guide climate-induced community relocations (Chapter 2) and for a comparative analysis of the governance issues that have affected the relocation process in the three Alaskan communities threatened by climate-induced erosion (Chapter 3).

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CHAPTER 1

METHODOLOGY

This dissertation is presented as a case study that examines three issues: 1) the nexus between climate-induced environmental change and human mobility; 2) the relocation process of Newtok, Alaska, an indigenous community located along the Bering Sea coast of western Alaska; and 3) a comparison of the relocation plans involving the indigenous communities of Newtok, Shishmaref and Kivalina. This case study has provided the opportunity to study two propositions. My first proposition is that climate – induced environmental changes will cause the permanent relocation of communities. My second proposition is that a community-led relocation will protect the human rights of community residents and foster individual and community resilience and long-term sustainability.

My dissertation seeks to answer the following questions:

1. What is the nexus between climate-induced environmental change and community relocation?

Sub-question:

What is the governance process, which includes community-level decision-making, which can determine whether and when communities must relocate because of climate-induced environmental change?

2. If communities are forced to relocate as a consequence of climate-induced environmental change, what governance structures, at the local, regional, national and international level, can encourage community resilience?

Sub-question:

What are relocation guiding principles, based in human rights doctrine at the international level, which can support a national relocation framework that can encourage the resilience of communities and the residents of those communities?

The case study of Newtok's relocation process provides an opportunity to learn more about the complexity of relocation. This case study seeks to refine and further develop existing theory on the human rights principles that apply to climate-induced population displacement and the nexus between environmental change and human mobility (Gerring, 2004).

Qualitative case-study methodology provides tools to study complex phenomena within their context through work in a field setting for an extended period of time (Yin, 2003). The case study approach emphasizes detailed analysis of real-life situations, participation through a variety of ways, observation while participating and note-taking while observing (Esterberg, 2002). According to Yin (2003) a case study design is an appropriate research methodology when the researcher cannot alter the behavior of those involved in the case study or the researcher wants to study contextual conditions because they are relevant to the subject of the study.

Case studies can generate theories that have broader applications (Eisenhardt, 1989). Walton (1992) states:

> [c]ases come wrapped in theories. They are cases because they embody causal processes operating in microcosm. At bottom, the logic of the case study is to demonstrate a causal argument about how general social forces take shape and produce results in specific settings.

The strengths of theory building from cases include the likelihood of generating novel theory and the likely empirical validity of the resultant theory because the theory-building process is so intimately connected to the evidence (Eisenhardt, 1989). My research began with observation and participation in Newtok's relocation process and developing a theory consistent with the data I was collecting and analyzing. This process is recognized as a "grounded theory" approach (Esterberg, 2002; Strauss and Corbin, 1998).

Using case studies to generate theories is a highly iterative process that allows for the sharpening of construct definitions, building evidence of the construct and increases the validity of the theory (Eisenhardt, 1989). Three constructs are critical to Newtok's relocation for the purpose of the research I conducted. First, Newtok's relocation is an example of a voluntary community-led relocation where the community voted to relocate. Second, the Newtok Traditional Council and federal and state government agencies have documented the impact of the environmental changes on the health and welfare of Newtok residents and the community's infrastructure since 1994. Third, the unit of analysis for this case study is at the community level as opposed to the individual or household. My goal was to be intimately familiar with Newtok's relocation process, so that the unique patterns of the case can emerge before determining what can be generalized as theory across relocation cases. For example, the issue of relocation land

selection and ownership will be critical to all communities faced with relocation. The land title issues for Newtok are unique because of Alaska's unique land settlement with the Alaska Native community (Case and Voluck, 2002). However, the fact that Newtok chose the relocation location, as opposed to a government-chosen relocation site, is a generalizable fact that can be tested in cross case studies outside of Alaska to determine how and whether a community's ability to choose a relocation location fosters the improvement of social and economic well-being of community residents.

Literature review is critical to the generation of theory in order to compare data from the case study with similar and conflicting literature (Eisenhardt, 1989). Literature review can build the internal validity of the case study, can raise the theoretical level and sharpen construct definition (Eisenhardt, 1989). In my dissertation, my literature review included the following topics: social-ecological resilience, migration theory, adaptive governance, climate change, environmental justice in the context of climate change. These general theoretical frameworks helped me to define the constructs regarding the nexus between climate change and human mobility by conceptually framing the unit of analysis and temporal space of the type of human mobility which was the focus of my research. In order to understand the nexus between climate-induced environmental change and human mobility, it was critical to clearly define the type of climate-induced environmental change that was causing a specific type of human mobility, permanent community relocation.

I also reviewed human rights legal doctrines including treaty documents, such as the UN Convention Relating to the Status of Refugees and the Universal Declaration on

the Rights of Indigenous People, and soft law human rights documents, such as the Guiding Principles of Internal Displacement. This literature was critical to determine whether any human rights doctrine existed that could provide human rights protections to communities displaced by climate-induced environmental change.

Environmentally-induced displacement literature helped me to define the construct regarding environmental change and caused me to focus on the on-going environmental changes that are often not considered to be a disaster, such as erosion and thawing permafrost. Disaster risk reduction and disaster-relief legislation and response within the US helped me to understand the current framework to respond and mitigate disasters.

1.1 Research Methods

The overarching research method of this dissertation is participant observation of the relocation process of Newtok, Alaska. This dissertation uses qualitative research methods from the social and social-ecological sciences, including feminist action research, which has been defined as "[t]he integration of activism and scholarship ..." and "... a value-oriented inquiry, based on the premise that it is good to better the condition of all individuals in society" (Reinharz, 1992). The research for this dissertation was conducted between 2007 and 2012.

At the time I began my research in 2007, I attended a panel discussion about Newtok's relocation at a Forum of the Environment conference in Anchorage, Alaska. Approximately twenty people were members of the panel. Three people represented the Newtok Traditional Council. The remaining members of the panel represented federal

and state organizations working with the Newtok Traditional Council on their relocation. Members of the Newtok Traditional Council began the discussion by describing the profound impact that accelerating rates of erosion were having on the community and that they had collectively decided that relocation was the best adaptation strategy to protect themselves from the erosion that the US Army Corps of Engineers predicted would claim the community's largest building, the school, by 2017. The remaining members of the panel each proceeded to state that they agreed that Newtok needed to relocate but that the agency that they represented did not know how to relocate the community because no agency had the technical, organizational or financial capacity. One member of the panel, a representative of the Alaska Division of Community and Regional Affairs spoke about an ad hoc governmental working group that had organized to figure out how to relocate the community. At the conclusion of the panel discussion, I asked if I could attend the meetings of the working group. In May 2007, I attended my first Newtok Planning Group meeting. I decided to focus my dissertation on the relocation efforts of the Newtok Planning Group after attending their meetings for approximately one year and making the connection between their efforts and the work of the United Nations University research on the nexus between environmental change and human mobility.

In November 2007, I attended my first meeting of the Immediate Action Workgroup, a sub-group of the Sub-cabinet on Climate Change created by Governor Palin in 2007. The Immediate Action Workgroup, co-chaired by a state and federal

government representative, focused on identifying the communities most at risk from climate change and identifying recommendations on how to respond.

In January 2008, soon after I began participating in the Newtok Planning Group and the Immediate Action Workgroup meetings, I met a research team from the Institute for Environment and Human Security at the United Nations University, located in Bonn,Germany, which had just received funding to research the nexus between environmental change and human mobility. Through this meeting, I was invited to participate in the expert working group organized by the United Nations University to develop an international research agenda focused on this issue.

My participation in these three working groups allowed me to focus this dissertation at the local, statewide and international level. Observation of the Newtok Planning Group and the community relocation meetings in Newtok were critical to my understanding of the logistics of the relocation process and the governance issues of physically relocating the infrastructure of the community. Observation of the Immediate Action Workgroup provided the opportunity to understand how state and federal government representatives were evaluating climate change impacts on community habitability and prioritizing community needs based on these threats. The Immediate Action Workgroup also initiated the development of a framework to prioritize community needs and evaluate when communities can be protected in place or need to relocate.

My participation in the United Nations University's expert working group provided the opportunity to connect my research in Newtok with research occurring at

the international level where researchers were seeking to understand the nexus between environmental change and human mobility and the legal and normative frameworks that need to be put in place to protect the human rights of those displaced by these changes.

Primary research techniques include literature review, archival analysis, document review, ethnographic interviews, event observation, and participatory research. Data-gathering tools used to collect evidence included surveys, interviews, direct observation, the gathering and study of organizational documents of the Newtok Planning Group and the Immediate Action Workgroup, including agendas, letters, e-mails, minutes, and news clippings about the relocation of Newtok, Kivalina and Shishmaref and the Newtok Planning Group. Thematic analysis of all of the data was critical in order to develop theory and constructs and to find linkages between the research data and the original research questions.

I participated, along with two interns working with the Denali Commission, in a household survey project organized by the Rural Community Action Program and interviewed 52 Newtok households. The purpose of the housing survey was to determine which houses would be able to relocate to Mertarvik and the socio-economic information of Newtok residents to determine their ability to pay for new housing. In addition, during the survey we had pictures of housing structures to determine whether residents would be interested in housing structures which used alternative design methods to increase energy efficiency.

The housing survey contained a five page list of questions divided into five sections: family makeup, property, income, housing structure, and community help. The

sources of income were divided into a sheet with eleven categories: yearlong, seasonal, sales of artwork, permanent fund dividend, Native corporation dividend, social security, public assistance, unemployment, disability, veteran's assistance, and other sources not listed. The surveys were completed over a span of two days. Some interviews took as little as ten minutes while others took an hour or longer. Findings from the survey included the information that many of the community residents lived in one bedroom homes with at least four or more people in one dwelling and that thirty-four households would like to be involved in building homes.

I also conducted open-ended interviews with six key members of the Newtok Planning Group and the Immediate Action Workgroup, including the Newtok Traditional Council tribal administrator, the Newtok Planning Group facilitator, the state co-chair of the Immediate Action Workgroup, the project liaison for the US Army Corps of Engineers and the program manager of Village Safe Water, a state agency that has played a critical role in Newtok's relocation and development of a strategic master relocation plan. IRB-approved semi-structured interviews with tribal, federal and state government officials included these questions:

1. How do you think a community should determine whether it needs to relocate?
2. What do you think are the indicators/factors that would determine that relocation is warranted?
3. What do you think should be the responsibility of state government to relocate a community?

4. What do you think should be the responsibility of tribal government to relocate a community?
5. What do you think should be the responsibility of federal government to relocate a community?
6. What do you think are the indicators to show relocation is a success?
7. What do you think will encourage a successful community relocation?

Archival document review included review of the following: erosion assessments conducted by the Newtok Traditional Council, the Shishmaref Erosion and Relocation Coalition and US Army Corps of Engineers; agendas and meeting minutes of the Immediate Action Workgroup Sub-Cabinet on Climate Change and the Newtok Planning Group; correspondence between the Newtok Planning Group and the Immediate Action Workgroup; results of the Newtok Housing Survey; Newtok Planning Group strategic planning reports; community relocation lay-out documents; geotechnical documents; community relocation reports for Kivalina, Shishmaref and Newtok; and, federal government relocation, erosion and climate change reports.

1.2 Participant Observation of a Relocation Process

I conducted the majority of the research for this dissertation by observing meetings of the Newtok Planning Group and the Immediate Action Work Group of the Sub-Cabinet on Climate Change from 2007 until the present. I took field notes and meeting minutes to record what I was observing and in a separate place also analyzed the data and my observations at the time I recorded what I was observing (Eisenhardt, 1989).

The Newtok Planning Group began meeting in May 2006 and continues to meet. The most recent meeting occurred in October 2012. Meetings occur several times each year based on the need to coordinate relocation activities and the need to share information. I have attended thirteen Newtok Planning Group meetings between May 1, 2007 and October 2012 and recorded these meetings by taking written notes. The specific dates of the meetings were: May 1, 2007; September 24, 2007; February 13, 2008; April 17, 2008; August 21, 2008; September 30, 2008; May 8, 2009; February 12, 2010; December 2, 2010; February 3, 2011; July 7, 2011; April 3, 2012, and October 15, 2012.

To write this dissertation I reviewed my notes as well as the notes taken by the Alaska Division of Community and Regional Affairs facilitator and did a thematic analysis, which focused on environmental hazards, relocation governance process, and includes institutional and funding analysis, and relocation infrastructure construction.

Different agency representatives participated in each meeting. The agenda for each meeting generally included emergency preparedness, agency updates on infrastructure development, strategic planning for relocation and coordination of funding and infrastructure construction at the relocation site. Some topics, such as compliance with the National Environmental Protection Act, have required repeated discussion in order to determine the best way to meet the requirements of this legislation. Each meeting generally lasted 3-4 hours.

Participants of the Newtok Planning Group include approximately 25 state, federal, tribal and non-profit organizations. Sub-committees of the Newtok Planning

Group included utilities, housing and transportation. The Alaska Department of Commerce, Community, and Economic Development (DCCED), Division of Community & Regional Affairs (DCRA) is the coordinator of the Newtok Planning Group.

Representatives of the Native Village of Newtok who participated in the Newtok Planning Group include: the Newtok Traditional Council (NTC) and Newtok Native Corporation (NNC). State representatives who participated in the Newtok Planning Group include: Alaska Department of Commerce, Community, and Economic Development (DCCED); Division; of Community & Regional Affairs (DCRA); Alaska Department of Environmental Conservation (DEC)/Village Safe Water Program (VSW); Alaska Department of Transportation and Public Facilities (DOT/PF); Alaska Department of Military and Veterans Affairs (DMV)/Division of Homeland Security and Emergency Management (DHS&EM); Alaska Department of Natural resources (DNR), Division of Coastal and Ocean Resources (DCOM); Alaska Department of Education and Early Development (DEED); Alaska Department of Health and Social Services (DHSS); Alaska Industrial Development and Export Authority (AIDEA)/Alaska Energy Authority (AEA); and, the Alaska Governor's Office.

Federal government representatives of the Newtok Planning Group include: U.S. Army Corps of Engineers (USACE), Alaska District; U.S. Department of Commerce, Economic Development Administration (EDA); U.S. Department of Agriculture, Rural Development (USDA-RD); U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS); U.S Department of Housing and Urban Development (HUD); U.S. Department of the Interior, Bureau of Indian Affairs (BIA); U.S Department

of Transportation, Federal Aviation Administration (FAA); U.S. Environmental Protection Agency (EPA); Denali Commission; and Senator Lisa Murkowski's Office.

Regional Organization representatives of the Newtok Planning Group include: the Association of Village Council Presidents Regional Housing Authority (AVCP); Coastal Villages Region Fund (CVRF); Lower Kuskokwim School District (LKSD); Rural Alaska Community Action Program (RurAL CAP); and, the Yukon-Kuskokwim Health Corporation (YKHC).

The agency officials present at the September 24, 2007 are representative of the people who participated in the Newtok Planning Group meetings. At this meeting, the following agencies were in attendance: Alaska Dept. of Commerce, Community & Economic Development (DCCED); Division of Community & Regional Affairs; Alaska Dept. of Environmental Conservation, Village Safe Water Program; Alaska District U.S. Army Corps of Engineers; Rural CAP; Alaska Dept. of Transportation & Public Facilities; Denali Commission; Office of Sen. Murkowski; USDA Natural Resources Conservation Service; U.S. Dept. of Commerce, Economic Development Administration; and the Alaska Division of Homeland Security & Emergency Management. Via teleconference: Stanley Tom (Newtok Traditional Council); Federal Aviation Administration; AVCP Regional Housing Authority; Newtok Relocation Fund; Newtok Native Corporation; Alaska Baseline Erosion Assessment Study/Alaska District Corps of Engineers.

Below is a representative list of the items discussed at each meeting:

September 30, 2008: Introductions and Review of Agenda: Sally Russell Cox, DCCED/DCRA; Innovative Readiness Training (IRT); Mertarvik Update September 15, 2008; IV. Emergency Response Plans: Andy Jones, DMVA/DHS& EM (Division of Homeland Security & Emergency Management); V. Sub-Committee Reports: a. Housing: David Vought, HUD; b. Utilities: Greg Magee, VSW/DEC; c. Transportation: Don Fancher, DOT/PF; VI. Agency Updates; V. Mertarvik Barge Landing and Staging Area: Morgan Merritt, Jasper Blair, DOT/PF.

May 8, 2009: Introductions and Review of Agenda: Sally Russell Cox, DCCED/DCRA; Mertarvik Barge Landing and Staging Area Update: Morgan Merritt, DOT/PF; Mertarvik Evacuation Shelter Design: Jack Hébert, Cold Climate Housing Research Center; Discussion on Potential Change of Community Location a. Community Layout Planning: Greg Magee, DEC Village Safe Water (VSW) Program, Laurie Cummings, HDR Alaska, Inc.; b. Sanitation Master Planning: Greg Magee, DEC/VSW; c. Access Road Design/Environmental Assessment: Andrea Elconin, Guy McConnell, Army Corps of Engineers; d. Airport Master Planning: Judy Chapman, Don Fancher, DOT/PF; Newtok Housing Survey Update and Results: Mitzi Barker, Charlene Stern, RurAL CAP; VI. Innovative Readiness Training Program Update; VII. Sub-Committee Reports a. Housing: David Vought, HUD; b. Utilities: Greg Magee, VSW/DEC; c. Transportation: Don Fancher, DOT/PF.

February 12, 2010: Summer 2009 Accomplishments: a. Mertarvik Barge Landing and Staging Area Overview: Mike Coffey, Bob Lundell, DOT/PF b. Innovative Readiness Training Program Base Camp: Major Craig Eck Planning for Mertarvik

Energy Infrastructure: Chris Mello, Alaska Energy Authority Summer 2010-2011 Activities: Mertarvik Access Road Design & Construction/Update to Environmental Assessment: Mike Coffey, DOT/PF; Andrea Elconin, USACE; Evacuation Shelter Design/Construction: Kim Mahoney, DOT/PF; Mertarvik Housing: David Vought, HUD; Airport Master Planning/Geotechnical Studies: Don Fancher, DOT/PF; IRT Civil Affairs Work in Newtok Village; Sanitation Master Planning/Well Drilling: Greg Magee, David Longtin, VSW; Mertarvik Quarry Operations: Major Craig Eck; Mertarvik Strategic Management Plan Sally Russell Cox, DCCED/DCRA; Sub-Committee Reports: Housing: David Vought, HUD; Utilities: Greg Magee, VSW/DEC; Transportation: Don Fancher, DOT/PF.

December 2, 2010: Sally Russell Cox, DCCED/DCRA; Mertarvik Community Layout Revision: Laurie Cummings, HDR Alaska, Inc.; Summer 2010 Accomplishments a. Mertarvik Access Road: Mike Coffey, Bob Lundell, DOT/PF; Mertarvik Strategic Management Plan Update Sally Russell Cox, DCCED/DCRA Summer 2011 Activities: Mertarvik Evacuation Center Design: Kim Mahoney, DOT/PF; Dave Longtin, VSW; Sanitation Master Planning (Mertarvik), Well Drilling, Indian Health Services Grant for Water/Sewer Upgrades (Newtok): Dave Longtin, VSW; Quarry Operations: Craig Boeckman, Mike Coffey, DOT/PF; MSG Chip Stoyer, IRT Red Horse d. Housing: Stanley Tom, NTC, Greg Stuckey, HUD; Airport Master Planning/Geotechnical Studies: Don Fancher, Judy Chapman, DOT/PF; IRT Civil Affairs Work in Newtok Village

I also attended the meetings of the Immediate Action Workgroup, a working group of the Sub-Cabinet on Climate Change. Co-chairs (federal and state) of the

Immediate Action Workgroup were a representative of the United States Army Corps of Engineers and the Department of Commerce, Community and Economic Development. Agency representatives of the Immediate Action Workgroup included the Department of Natural Resources, Division of Forestry, Department of Transportation and Public Facilities, Denali Commission; Alaska Municipal League; Alaska State Legislative Budget & Audit Committee - Bob Pawlowski; Alaska Division of Homeland Security / Emergency Management - John Madden; National Oceanic and Atmospheric Administration - Amy Holman; Alaska Native Tribal Health Consortium - Steve Weaver; Environmental Protection Agency - Jackie Kramer; US Economic Development Administration - Department of Commerce; AK Office - Shirley Kelly.

The first meeting of the Immediate Action Workgroup, which I attended, occurred in November 2007. Subsequent meetings that I attended occurred on: February 12, 2008; February 19, 2008 ; March 4, 2008, March 20, 2008; April 17, 2008 August 27, 2008; October 28, 2008; November 10, 2008, November 24, 2008 December 5, 22, 2008; January 27, 2009; February 23, 2009; October 16, 2009 ; September 11, 2009; December 3, 2009; November 23, 2010; June 3, 2010; May 17, 2010; February 11, 2010; March 3, 2011; February 17, 2011; February 3, 2011. These meetings were generally full-day meetings.

As part of this dissertation research, I also traveled to Newtok to observe the community relocation meetings and to Mertarvik, the relocation site, to observe infrastructure development at the relocation site. I first traveled to Newtok in December 2007 to observe the first community relocation meeting where presentations were made

about the community lay-out plan. This first meeting occurred in the evening and approximately 50 Newtok residents attended. The next day, presentations were made to a 9th grade class to engage the youth in the relocation-planning process. Since December 2007, I have visited Newtok 9 times. I stay in Newtok for two to three days during each visit.

I also traveled to Newtok in April and July 2008, in August 2009, in December 2010, September 2011, June 2012, August 2012 and, most recently, September 2012. In July 2008, I conducted the housing survey, with two other student interns, all from the residents of Newtok. Prolonged and consistent observation of Newtok's relocation process has allowed me to develop rapport with members of the Newtok Traditional Council, the Newtok Planning Group and the Newtok community residents so that multiple perspectives can be collected and understood (Krefting, 1991). I have also integrated a process of data checking, where I have shared my research and interpretations of the data with the Newtok Planning Group and the Newtok Traditional Council so that they have had the opportunity to discuss and clarify the interpretation, and contribute new or additional perspectives (Krefting, 1991).

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CHAPTER 2

CLIMATE-INDUCED COMMUNITY RELOCATIONS:

A CASE STUDY OF NEWTOK[A]

2.1. INTRODUCTION

Climate change is rapidly transforming our natural environment with disastrous consequences for many communities. Scientists believe that climate change will increase the duration and frequency of extreme weather events, such as hurricanes, tropical cyclones, and storm surges.[1] The extreme weather events that occurred during the summer of 2010 provide evidence that these climate predictions are accurate. According to the World Meteorological Organization, the intense heat and wildfires in Russia, the destructive floods in Pakistan, and the calving of a two-mile glacier in Greenland fit the pattern of "more frequent and more intense extreme weather events due to global warming."[2] Such disasters led to the deaths of 700 people each day in Moscow and the

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[A] Published: Bronen, R., 2011. Climate-Induced Community Relocations: Creating An Adaptive Governance Response Based in Human Rights Doctrine. NYU Review of Law and Social Change 35 (2) 357-407.

1. *See* Intergovernmental Panel on Climate Change, *Summary for Policymakers*, *in* CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS 8, 14 (Susan Solomon, Dahe Qin, Martin Manning, Zhenlin Chen, Melinda Marquis, Kristen Avery, Melinda M.B. Tignor & Henry LeRoy Miller, Jr. eds., 2007); PIER VELLINGA & WILLIAM J. VAN VERSEVELD, CLIMATE CHANGE AND EXTREME WEATHER EVENTS 36 (2000).

2. Charles J. Hanley, *Long, Hot Summer of Fire, Floods Fits Predictions*, USA TODAY, Aug. 13, 2010, http://www.usatoday.com/weather/climate/2010-08-12-predictions-weather.htm.

displacement of approximately fourteen million people in Pakistan.[3] Humanitarian organizations have tried to ameliorate the effects of these disasters through relief efforts. The International Organization for Migration (IOM) executed more than sixty projects responding to natural disasters in twenty-seven countries across four continents in 2007 and 2008.[4] Financial support to address natural disasters increased from one-fifth of the total funding received by IOM in 2006, to one-quarter in 2008.[5] However, there may be no way to quickly reverse the harm caused by climate change. Thus, community relocation may be the only immediate and permanent solution to protect people facing climate-induced ecological change.[6] I use the term "climigration" to describe the population displacement that results when entire communities are rendered uninhabitable because of these changes.[7]

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3. Tom Parfitt, *Moscow Death Rate Doubles as Smoke from Wildfires Shrouds Capital*, GUARDIAN (U.K.), Aug. 9, 2010, http://www.guardian.co.uk/world/2010/aug/09/moscow-death-rate-russia-wildfires; *Pakistan Floods 'Hit 14m People,'* BBC (Aug. 6, 2010), http://www.bbc.co.uk/news/world-south-asia-10896849.

4. INT'L ORG. FOR MIGRATION, POLICY BRIEF: MIGRATION, CLIMATE CHANGE AND THE ENVIRONMENT 6 (2009).

5. *Id.*

6. The draft text of the U.N. Framework Convention on Climate Change Ad Hoc Working Group on Long-Term Cooperative Action includes "planned relocations" as one of the adaptation strategies that parties to the Convention need to enhance. Section 14(f), U.N. FRAMEWORK CONVENTION ON CLIMATE CHANGE AD HOC WORKING GROUP ON LONG-TERM COOPERATIVE ACTION UNDER THE CONVENTION, DRAFT DECISION -/CP.16: OUTCOME OF THE WORK OF THE AD HOC WORKING GROUP ON LONG-TERM COOPERATIVE ACTION UNDER THE CONVENTION (2010), http://unfccc.int/files/meetings/cop_16/application/pdf/cop16_lca.pdf#page=3. By implementing legislation to respond to climigration, not only would the United States create a model for other governments to use, it would also comply with international standards requiring states to address this issue.

7. As I described in my previous chapter,

> "Climigration" is the term that best describes this kind of community displacement. Climigration results from gradual climate-induced ecological changes, combined with repeated extreme weather events, which severely impact infrastructure, such as health clinics and schools, as well as the livelihoods and well-being of the people residing in the community. Climigration occurs when a community is no longer sustainable for ecological reasons. Climigration differs from population displacement caused by catastrophic random environmental events, such as hurricanes, where disaster relief and the temporary relocation of individuals and communities are the humanitarian responses. Climigration means there is no ability to return home because home is under water or

Alaskan indigenous communities are at the forefront of climate-induced population displacement. Climate change is transforming Arctic ecosystems and threatening the way of life of the indigenous peoples who live along the navigable waters of Alaska's coasts and rivers.[8] Disaster relief and hazard mitigation have been the traditional humanitarian responses to extreme environmental events.[9] Yet government agencies are no longer able to protect communities despite spending millions of dollars on erosion control and flood relief. According to the Alaska Division of Homeland Security and Emergency Management, since 1978 there have been state disaster declarations for 119 different Alaska communities resulting from 228 flooding events.[10] These extreme events are occurring with greater frequency: approximately forty percent of these flood disasters occurred from 2000 to 2008, with twenty-three occurring in 2005.[11]

In Alaska, some indigenous communities have determined that relocation is the only solution that will protect them from the combination of climate-induced ecological changes caused by rising temperatures, thawing permafrost, and loss of arctic sea ice.[12] Yet complex governance issues must be resolved in order to facilitate relocation. No

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sinking in thawing permafrost. Robin Bronen, *Forced Migration of Alaskan Indigenous Communities Due to Climate Change*, *in* ENVIRONMENT, FORCED MIGRATION AND SOCIAL VULNERABILITY 87, 89 (Tamer Afifi & Jill Jäger eds., 2010).

8. ARCTIC CLIMATE IMPACT ASSESSMENT, IMPACTS OF A WARMING CLIMATE 92–97 (2004).

9. *See* U.S. GOV'T ACCOUNTABILITY OFFICE, ALASKA NATIVE VILLAGES: LIMITED PROGRESS HAS BEEN MADE ON RELOCATING VILLAGES THREATENED BY FLOODING AND EROSION 20 (2009) [hereinafter GAO 2009] (describing disaster relief and hazard mitigation efforts of the Federal Emergency Management Agency).

10. *Id.* at 7.

11. *Id.*

12. Kivalina and Shishmaref are indigenous communities located on barrier islands on the northwest coast of Alaska. Both communities have voted to relocate. *See Shishmaref Erosion & Relocation Coalition,* SHISHMAREF EROSION & RELOCATION COAL., http://www.shishmarefrelocation.com/ (last visited Feb. 25, 2011); U.S. ARMY CORPS OF ENG'RS, KIVALINA RELOCATION PLANNING MASTER PLAN 1 (2006), http://www.poa.usace.army.mil/en/cw/Kivalina/Executive%20Summary.pdf.

federal or state government agency has the authority to relocate communities, no governmental organization can address the strategic planning needs of relocation, and no funding is specifically designated for relocation.[13] Furthermore, determining which communities are most likely to encounter displacement will require a sophisticated assessment of a community's susceptibility to climate change, as well as the vulnerability of its social, economic and political structures.

This article describes the efforts of federal, state, and tribal governments to relocate Newtok, an indigenous community in Alaska. Newtok is one of at least twelve communities that need to relocate due to climate change. According to tribal, state, and federal government officials, including the U.S. Army Corps of Engineers, the relocation of Newtok is the only permanent solution to protect its residents.[14] However, the relocation effort is straining the capacities of tribal, local, regional, and national government agencies.[15] The policy and practical challenges to relocating the community are enormous and clearly demonstrate the need for new governance institutions that specifically respond to climate-induced relocation. This Article proposes the design and implementation of a unique adaptive governance relocation framework based in human rights doctrine.

In Part II, I provide an overview of the climate-induced ecological changes occurring

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13. GAO 2009, *supra* note 8, at 39–41.

14. *See* U.S. ARMY CORPS OF ENG'RS, SECTION 117 PROJECT FACT SHEET 14–20 (2008), http://www.commerce.state.ak.us/dca/planning/pub/Newtok_Sec_117.pdf [hereinafter SECTION 117 PROJECT FACT SHEET] (evaluating the impact of erosion and storms on Newtok's infrastructure and examining alternatives to respond to the damage caused by these ecological events); IMMEDIATE ACTION WORKGROUP, RECOMMENDATIONS REPORT TO THE GOVERNOR'S SUBCABINET ON CLIMATE CHANGE 47–51 (2008), http://www.climatechange.alaska.gov/docs/iaw_rpt_17apr08.pdf [hereinafter IAW 2008 RECOMMENDATIONS].

15. *See infra* Part IV.

in Alaska. In Part III, I analyze the post-disaster recovery and hazard mitigation laws that define the current humanitarian response to extreme weather events in the United States. Part IV describes how climate change is creating an unprecedented social and ecological crisis in the Alaskan indigenous community of Newtok. Part V proposes the enactment of an adaptive governance framework, based in human rights doctrine, to protect people residing in communities threatened by climate change.

2.2 CLIMATE CHANGE IN ALASKA

In the Northern Hemisphere, data indicate that the temperature increase in the Twentieth Century is "likely to have been the largest of any century during the past 1,000 years."[16] The 2007 Intergovernmental Panel on Climate Change (IPCC) report confirmed that both the average near surface air temperature over land and the average sea surface temperature has increased, so that "[e]leven of the last twelve years (1995–2006) rank among the twelve warmest years in the instrumental record of global surface temperature (since 1850)."[17] These temperature increases are the most pronounced in the Arctic, where the average temperature increase is almost twice the global average for the previous 100 years.[18] In Alaska, winter temperatures have increased an average of two to 3.5 degrees Celsius since 1975.[19] These temperature increases are creating dynamic and

16. *See* Intergovernmental Panel on Climate Change, *Summary for Policymakers*, *in* CLIMATE CHANGE 2001: THE SCIENTIFIC BASIS 1, 2 (J.T. Houghton, Y. Ding, D.J. Griggs, M. Noguer, P.J. van der Linden, X. Dai, K. Maskell & C.A. Johnson eds., 2001).

17. Intergovernmental Panel on Climate Change, *supra* note 1, at 5.

18. *Id.*, at 7.

19. MARTHA SHULSKI & GERD WENDLER, THE CLIMATE OF ALASKA 134 (2007); Peter Lemke, Jiawen Ren, Richard B. Alley, Ian Allison, Jorge Carrasco, Gregory Flato, Yoshiyuki Fujii, Georg Kaser, Philip Mote, Robert H. Thomas & Tingjun Zhang, *Observations: Changes in*

complex changes to the natural landscape, including the aquatic and terrestrial ecosystems.[20]

Increased temperatures are causing the rapid disappearance of ice, a critical element of the arctic ecosystem, signaling a radical transformation of the environment and the communities that rely on its existence.[21] According to an international group of researchers, less ice covers the Arctic today than at any time in recent geologic history.[22] Record minimum levels of Arctic sea ice have been recorded since 2002.[23] Scientific observations of the arctic sea ice extent during the summer of 2007 documented a new record low, with twenty-three percent less ice coverage measured than the previous record of September 2005, a loss equivalent to the size of California and Texas combined.[24] In 2009, the National Snow and Ice Data Center documented the third lowest sea ice extent since satellites began documenting ice levels in 1979.[25]

The decreased arctic sea ice extent coupled with warming temperatures has caused a

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Snow, Ice and Frozen Ground, *in* CLIMATE CHANGE 2007, *supra* note 1, at 337, 339.

20. Eric Post, Mads C. Forchhammer, M. Syndonia Bret-Harte, Terry V. Callaghan, Torben R. Christensen, Bo Elberling, Anthony D. Fox, Olivier Gilg, David S. Hik, Toke T. Høye, Rolf A. Ims, Erik Jeppesen, David R. Klein, Jesper Madsen, A. David McGuire, Søren Rysgaard, Daniel E. Schindler, Ian Stirling, Mikkel P. Tamstorf, Nicholas J.C. Tyler, Rene van der Wal, Jeffrey Welker, Philip A. Wookey, Niels Martin Schmidt & Peter Aastrup, *Ecological Dynamics Across the Arctic Associated with Recent Climate Change*, 325 SCIENCE 1355 (2009).

21. *See generally* ARCTIC CLIMATE IMPACT ASSESSMENT, *supra* note 8 (describing the effects of a warming climate on Arctic ice).

22. Leonid Polyak, Richard B. Alley, John T. Andrews, Julie Brigham-Grette, Thomas M. Cronin, Dennis A. Darby, Arthur S. Dyke, Joan J. Fitzpatrick, Svend Funder, Marika Holland, Anne E. Jennings, Gifford H. Miller, Matt O'Regan, James Savelle, Mark Serreze, Kristen St. John, James W.C. White & Eric Wolff, *History of Sea Ice in the Arctic*, 29 QUATERNARY SCI. REVS. 1757, 1773 (2010).

23. Mark C. Serreze, Arctic Climate Change: Where Reality Exceeds Expectations, Witness the Arctic, Winter 2008/2009, at 3–4, http://www.arcus.org/files/witness-the-arctic/2009/1/pdf/wta2008_v13i01.pdf.

24. *Id.* "Sea ice extent" is the area of the Arctic Ocean covered by sea ice. *See id.*

25. Press Release, Nat'l Snow & Ice Data Ctr., Arctic Sea Ice Extent Remains Low; 2009 Sees Third-Lowest Mark (Oct. 6, 2009), http://nsidc.org/news/press/20091005_minimumpr.html.

delay in the freezing of the Bering and Chukchi Seas.[26] Since the 1980s, the arctic seas are remaining ice-free approximately three weeks longer in the autumn.[27] The delay in freezing of the Arctic seas has left many communities exposed to the autumnal storms that originate in the Pacific and occur primarily between August and early December.[28] These Bering Sea storms, though technically not hurricanes, can cause hurricane strength damage on the coast due to wave action and storm surges.[29]

Furthermore, climate change has affected the land itself. Along the northwestern Alaskan coast, permafrost—permanently frozen subsoil—is the "glue" that keeps the land intact and habitable.[30] But warming temperatures are also causing the permafrost to thaw.[31] In 2007, the IPCC reported that the temperature of the top layer of permafrost has increased by up to three degrees Celsius since the 1980s.[32]

The complex interplay of these ecological changes is now endangering the indigenous communities that have inhabited the Arctic and boreal forest for millennia. Approximately 200 indigenous communities are located along Alaska's coasts and rivers, each one of which is dependent on easy access to navigable waters to fish and hunt

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26. *See* GARY HUFFORD & JAMES PARTAIN, CLIMATE CHANGE AND SHORT-TERM FORECASTING FOR ALASKAN NORTHERN COASTS 1 (2005) ("Sea ice is showing an approximate 8 percent decrease in areal extent since 1954, with winter freeze-up and spring melt arriving about three weeks later and earlier, respectively.").

27. GARY HUFFORD & JAMES PARTAIN, CLIMATE CHANGE AND SHORT-TERM FORECASTING FOR ALASKAN NORTHERN COASTS 1 (2005).

28. *Id.*; SHULSKI & WENDLER, *supra* note 18, at 122.

29. David E. Atkinson, Int'l Arctic Research Ctr., Coastal Hazards in Alaska: Threats, Trends and Needs, Presentation at the University of Alaska, Fairbanks (Nov. 6, 2007).

30. GAO 2009, *supra* note 9, at 7.

31. Serreze, *supra* note 23, at 4.

32. Lemke, Ren, Alley, Allison, Carrasco, Flato, Fujii, Kaser, Mote, Thomas & Zhang, *supra* note 18 at 339.

marine mammals.[33] Food gathering is central to their culture and survival.[34] Because these communities have a small cash economy, and store-bought food is expensive due to the high cost of transporting food to rural communities, subsistence harvests are essential.[35] The changes in sea ice and permafrost have threatened their way of life by altering the ecosystems upon which these communities rely.

Arctic sea ice and frozen tundra provide critical ecosystem "services," such as protection from autumn storms and a firm foundation for construction, respectively.[36] Climate change is degrading these ecosystem services and the communities they protect. Near-shore pack ice has, in the past, protected coastal villages from erosion and flooding by creating a barrier to storm-related waves and surges.[37] The loss of Arctic sea ice coupled with thawing permafrost is causing erosion.[38]

Since 2003, the U.S. government has issued several reports documenting the increasing severity of climate-induced threats to Alaska Native villages.[39] In 2003, the U.S. Government Accountability Office (GAO) found that flooding and erosion affect

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33. U.S. GOV'T ACCOUNTABILITY OFFICE, ALASKA NATIVE VILLAGES: MOST ARE AFFECTED BY FLOODING AND EROSION, BUT FEW QUALIFY FOR FEDERAL ASSISTANCE 7–8 (2003) [hereinafter GAO 2003] (analyzing erosion and flooding in nine Alaska Native villages and assessing their ability to acquire federal funding to address these ecological threats).

34. VILL. OF NEWTOK, LOCAL HAZARDS MITIGATION PLAN 9 (2008) [hereinafter LOCAL HAZARDS MITIGATION PLAN], http://www.commerce.state.ak.us/dca/planning/pub/Newtok_HMP.pdf.

35. *See* Rural Alaska Community Action Program, *Newtok: As Erosion Gnaws Towards Village, Its People Seek Means to Relocate*, 9 ALASKA'S VILLAGE VOICES 10, 13–14 (2006) [hereinafter RurAL CAP] (describing the hunting and fishing practices of Newtok inhabitants).

36. *See* LOCAL HAZARDS MITIGATION PLAN, *supra* note 34, at 24–28 (describing the hazards caused by melting sea ice and tundra).

37. *See id.* at 27 ("Sea ice retreat allows larger storm surges to develop in the increased open water areas, increasing erosion, sedimentation, and risk of inundation in coastal areas.").

38. GAO 2009, *supra* note 9, at 7.

39. *See, e.g.*, U.S. ARMY CORPS OF ENG'RS, ALASKA BASELINE EROSION ASSESSMENT (2009) (assessing erosion issues in 176 communities in Alaska and prioritizing twenty-six for immediate federal, state and local intervention), http://www.climatechange.alaska.gov/docs/iaw_USACE_erosion_rpt.pdf

184 indigenous villages, constituting approximately eighty-six percent of all Alaska Native communities.[40] The report also found that flooding and erosion imminently threatened four villages—Kivalina, Koyukuk, Newtok, and Shishmaref—which were planning to relocate.[41] Six years later, the GAO issued a second report that found that the number of Alaskan villages seeking to relocate due to the immediate threat of climate-induced ecological change had tripled to twelve.[42] Even with their survival in imminent danger, none of the villages has yet been relocated because of the governance issues that must be overcome to facilitate relocation.[43] The 2009 GAO report recognized that no government agency has the authority to relocate communities, no governmental organization exists that can address the strategic planning needs of relocation, and no funding is specifically designated for relocation.[44] Despite these obstacles, one community, Newtok, is in the process of relocation.[45]

40. GAO 2003, *supra* note 32, at 2–3.
41. *Id.* at 4.
42. GAO 2009, *supra* note 8, at 16.
43. *Id.* at 27.
44. *See id.* at 24–27 (noting that "no comprehensive proactive federal relocation program exists to assist villages with their relocation efforts" and describing the funding sources available to address storm damage and erosion).
45. *See* discussion *infra* Part IV.

2.3 CURRENT LAWS GOVERNING DISASTER RELIEF

Hazard mitigation and post-disaster relief are the traditional humanitarian responses to extreme environmental events, such as flooding, occurring in Alaska.[46] The statutory framework that governs post-disaster recovery and hazard mitigation encourages rigid responses to specifically defined random weather events. On the one hand, the federal post-disaster recovery humanitarian response has focused on providing temporary emergency assistance after a disaster.[47] On the other hand, hazard mitigation planning is mostly intended to reduce reliance on federal resources in the event of a disaster and to minimize the damage caused by severe weather events.[48] Neither of these responses addresses environmental disasters that occur gradually and require relocation.

Complex state and federal laws in the United States strictly define the term "major disaster" and "emergency" and specifically describe the type of hazard mitigation and post-disaster relief work that can be performed.[49] Moreover, federal and state funding can only be accessed within limited timeframes and for particular activities.[50] These significant statutory limitations prevent the government from responding effectively to

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46. *See supra* note 9 and accompanying text.

47. *See generally* MITCHELL L. MOSS & CHARLES SHELHAMER, CTR. FOR CATASTROPHE PREPAREDNESS & RESPONSE, THE STAFFORD ACT: PRIORITIES FOR REFORM (2007), http://www.nyu.edu/ccpr/pubs/Report_StaffordActReform_Mitchell_Moss_10.03.07.pdf (identifying problems in federal disaster response and recommending new "catastrophic" designation under Stafford Act and improved response systems for FEMA).

48. *Cf. id.*

49. *See generally* The Robert T. Stafford Disaster Relief and Emergency Assistance (Stafford) Act, 42 U.S.C. §§ 5121–5208 (2006) (outlining when and how the federal government will respond to disasters).

50. *See generally id.*; ALASKA STAT. § 26.23.020 (2008); Immediate Action Workgroup, Meeting Summary, Jan. 18, 2008, at 3–6. The Immediate Action Workgroup is a working group of the Alaska Sub-Cabinet on Climate Change tasked with the responsibility to make recommendations regarding the actions and policies to be taken within twelve to eighteen months to prevent loss of life and property in Alaska's communities that have been identified as those in greatest peril due to climate change.

the gradual climate-induced ecological changes that are forcing communities to relocate in Alaska.

2.3.1 Post-Disaster Recovery

The two federal statutes that define hazard mitigation and disaster relief do not make provisions for the relocation of an entire community, thus limiting the federal government's ability to respond. The Alaska state statutes mirror the federal scheme and are therefore equally limited.

The Federal Emergency Management Agency (FEMA) is the federal agency responsible for hazard mitigation and disaster relief.[51] The Robert T. Stafford Disaster Relief and Emergency Assistance Act, enacted in 1988, defines all FEMA post-disaster relief and hazard mitigation activities.[52] A key component of the Act requires a presidential disaster declaration to access federal funding for post-disaster recovery as well as most hazard mitigation activities.[53] Generally, the Governor of an affected state must request this presidential disaster declaration.[54] Under the Stafford Act, the President is authorized to declare a disaster for natural catastrophes such as hurricanes, tornados, storms, high water, wind driven water, tidal waves, tsunamis, earthquakes, volcanic eruptions, landslides, mudslides, snowstorms, or drought.[55] Drought is the only gradual ecological process listed in the statute that may serve as the catalyst for a presidential

51. GAO 2009, *supra* note 9, at 20.
52. Stafford Act, 42 U.S.C. §§ 5121–5208. *See also* the enabling regulations enacted by FEMA, 44 C.F.R. §§ 206.31–206.48 (2009) (enabling regulations enacted by FEMA).
53. 42 U.S.C. § 5170.
54. *Id.*
55. 42 U.S.C. § 5122.

disaster declaration.[56] Erosion, which is one of the significant hazards faced by Alaskan coastal communities, is not included in the list of major disasters defined in the Stafford Act.[57]

Funding for post-disaster recovery is limited to actual disasters or imminent threats to life and property and generally begins on the date of the occurrence of the event that prompted the presidential disaster declaration.[58] Subsequently, the Stafford Act provides for different levels of federal assistance depending on the magnitude of damage caused by the environmental event.[59] The President may declare either an emergency, which is typically a smaller event where a limited federal role suffices, or a major disaster, which occurs where the natural catastrophe causes damage of greater severity and magnitude.[60] Federal resources are intended to merely supplement state and local resources for post-disaster recovery.[61] The federal government pays seventy-five percent of the cost of recovery aid to state, local, and tribal governments; this includes the repair and replacement of damaged structures, such as buildings, utilities, roads, and bridges.[62] Individuals and households are also eligible for post-disaster recovery funding, including temporary housing assistance to individuals whose homes are rendered uninhabitable

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56. *See id.*
57. *Id.*
58. *See* 42 U.S.C. § 5189b (2006) ("Eligibility for Federal assistance under this subchapter shall begin on the date of the occurrence of the event which results in a declaration by the President that a major disaster exists; except that reasonable expenses which are incurred in anticipation of and immediately preceding such event may be eligible for Federal assistance under this chapter.").
59. *See* 42 U.S.C. § 5193 (2006) (authorizing additional assistance beyond the normal $5 million cap where "there is a continuing and immediate risk to lives, property, public health or safety").
60. 42 U.S.C. § 5122.
61. *See* MOSS & SHELHAMER, *supra* note 47, at 7.
62. 42 U.S.C. § 5170b (2006).

because of a disaster.[63] These strategies, however, are designed to help rebuild individual homes in their current location, not rebuild communities in a new one.[64]

In response to Hurricane Katrina, in 2006 Congress enacted the Post-Katrina Emergency Management Reform Act[65] to strengthen the federal government's ability to respond to natural disasters. Recognizing that natural disasters can cause "extraordinary levels" of damage to infrastructure as well as mass population displacement, Congress established a catastrophic disaster response level. However, the legislation did not change the Stafford Act's definitions of a major disaster or emergency, which are primarily limited to a one-time or a random extreme weather event.[66] The legislation also did not change the long-term recovery goal of the Stafford Act—i.e., to rebuild devastated communities in the same location.[67] Although the legislation included the development of a national disaster housing strategy[68] and programs to facilitate family reunions and locate displaced children,[69] the legislation did not authorize any funding or operational

63. *See* 42 U.S.C. § 5174 (2006) (stating that the government "may provide financial assistance, and, if necessary, direct services, to individuals and households in the State who, as a direct result of a major disaster, have necessary expenses and serious needs in cases in which the individuals and households are unable to meet such expenses or needs through other means").

64. GAO 2009, *supra* note 8, at 20. *See also* EDWARD A. THOMAS & SARAH K. BOWEN, POST-DISASTER RECONSTRUCTION: THE PATCHWORK QUILT 20 (2008) (describing the FEMA Individual and Households Program, which limits funds to temporary housing and repair and replacement of homes), http://www.floods.org/PDF/Post_Disaster_Reconstruction_Patchwork_Quilt_ET.pdf; FED. EMERGENCY MGMT. AGENCY, PUBLIC ASSISTANCE POLICY DIGEST 2008, at 5 (2008) (describing the Alternate Project Program, where construction of new public facilities must be within the declared disaster area), http://www.fema.gov/pdf/government/grant/pa/pdigest08.pdf.

65. Post-Katrina Emergency Management Reform Act of 2006, Pub. L. No. 109-295, 120 Stat. 1394 (codified as amended in scattered sections of the U.S.C.).

66. *See id.* § 681 (amending Stafford Act §§ 402, 502, 42 U.S.C. §§ 5170a, 5192).

67. *See id.*

68. 6 U.S.C. § 772 (2006).

69. 6 U.S.C. §§ 774–775 (2006).

guidance for the relocation of an entire community.[70] As a consequence, neither the Stafford Act nor the Post-Katrina Emergency Management Reform Act provides a statutory framework for community relocation.[71]

The Alaska statutes that govern the state's post-disaster response mirror the federal statutory framework. The Governor is authorized to declare a "disaster emergency" if a natural catastrophe or the outbreak of a disease causes or threatens to cause severe damage or loss of life.[72] The Alaska statutory definition of a disaster is almost identical to the federal definition.[73] Likewise, the Governor must declare a disaster emergency before funds are available to respond.[74] Funding can only be used to restore infrastructure to its condition before the occurrence of the disaster.[75] The Alaska Division of Homeland Security and Emergency Management (DHS&EM) is the state agency that coordinates the state's post-disaster recovery efforts and also administers the FEMA-funded hazard mitigation and post-disaster grant programs.[76] This structure of agency responsibility

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70. 6 U.S.C. § 701(4) (2006).

71. *Cf.* GAO 2009, *supra* note 9, at 24 ("While no comprehensive proactive federal relocation program exists to assist villages with their relocation efforts, individual agencies are providing some relocation assistance.").

72. *See* ALASKA STAT. § 26.23.900(2)–(3) (2008).

73. *Compare* ALASKA STAT. § 26.23.900(2) (defining "disaster" as a "result from . . . an incident such as storm, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, avalanche, snowstorm, prolonged extreme cold, drought, fire, flood, epidemic, explosion, or riot"), *with* 42 U.S.C. § 5122(2) (2006) ("'Major disaster' means any natural catastrophe (including any hurricane, tornado, storm, high water, winddriven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm or drought), or . . . any fire, flood, or explosion"). *See also* Newtok Planning Group, Meeting Summary, June 9, 2006, at 3, http://www.commerce.state.ak.us/dca/planning/pub/June9_Newtok_meeting_summary.pdf.

74. ALASKA STAT. § 26.23.020 (2008).

75. *See* ALASKA STAT. § 26.23.010 (2008) (listing "provid[ing] a setting conducive to the . . . restoration of property affected by a disaster" as one of the purposes of the Alaska Disaster Act).

76. ALASKA STAT. §§ 26.20.025, 26.23.040 (2008). *See also* LOCAL HAZARDS MITIGATION PLAN, *supra* note 34, at 18; ALASKA DIV. OF HOMELAND SEC. & EMERGENCY MGMT., STATE HOMELAND SECURITY STRATEGY 2 (2008), http://www.ak-prepared.com/grant_forms/acrobat_docs/Alaska%202008%20State%20Homeland%20Security%

replicates the one at the federal level, and is therefore similarly ineffective in addressing the needs for relocation.

2.3.2 Hazard Mitigation

The federal program for pre-disaster mitigation comprises five FEMA grant programs, none of which provide for community-wide relocation. The Disaster Mitigation Act of 2000[77] modified the Stafford Act by establishing a federal program for pre-disaster mitigation.[78] Mitigation activities are designed to protect communities from naturally occurring hazards that may endanger people or cause permanent property damage.[79] Mitigation measures may be implemented prior to, during, or after a disaster and should include programs meant to "reduce the potential impacts of future disasters."[80]

The FEMA grant programs for mitigation activities have strict local government cost-sharing requirements and require a twenty-five percent local or state government match.[81] Crucially, according to the GAO, "villages often fail to qualify for these programs" because of these requirements.[82] This restriction also prevents disaster-affected communities from using other federal funding from agencies such as the U.S.

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20 Strategy.pdf.

77. Disaster Mitigation Act of 2000, Pub. L. No. 106-390, 113 Stat. 1152 (codified as amended in scattered sections of 42 U.S.C.).

78. *Id.* § 102(a), 42 U.S.C. § 5133(b) (2006).

79. *Id. See generally* 44 C.F.R. Part 201 (2009) (providing regulations implementing the Disaster Mitigation Act of 2000).

80. U.S. DEP'T OF HOMELAND SEC., NATIONAL RESPONSE FRAMEWORK 46 (2008), http://www.fema.gov/pdf/emergency/nrf/ nrf-core.pdf.

81. *See* GAO 2009, *supra* note 9, at 20–21, 37 (describing various cost-sharing requirements); Immediate Action Workgroup, Meeting Summary, Jan. 18, 2008, at 4, http://www.climatechange.alaska.gov/docs/iaw_18jan08_sum.pdf (same).

82. GAO 2009, *supra* note 8, at 20.

Army Corps of Engineers, which has the authority to construct flood and erosion control projects to satisfy the cost share requirement.[83] Furthermore, no single federal program exists to proactively provide operational guidance and funding for the relocation of an entire community.[84]

Three of the five FEMA mitigation grant programs are exclusively designated for flood assistance and require participation in the National Flood Insurance Program (NFIP).[85] The National Flood Insurance Act of 1968 allows any owner or renter of property located in a community participating in the NFIP to purchase a flood insurance policy.[86] This flood insurance program both burdens and offers assistance to individual private property owners but does not contemplate relocation of entire communities.[87] To participate in the NFIP, Alaska state agencies must consider, and seek to limit, potential flood and erosion damage when enforcing land use and building regulations.[88] Thus, in 1998, former Governor Tony Knowles issued an administrative order requiring state-owned and state-financed construction projects to be sited and constructed in a manner that reduces the potential for flood and erosion damage.[89] While this does not make it more difficult for communities to relocate, it did create a barrier to Newtok to receiving

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83. *See* THOMAS & BOWEN, *supra* note 63, at 11 (describing the U.S. Army Corps of Engineer Flood Management Services Program and Planning Assistance to States Program, which authorize flood assistance to non-federal entities, and noting that the U.S. Army Corps of Engineers is prohibited from funding flood control work).

84. GAO 2009, *supra* note 9, at 20.

85. *Id.* at 21.

86. *See* 42 U.S.C. §§ 4001–4012a (2006) (describing the NFIP).

87. Local governments are eligible to participate in the flood insurance program if they are incorporated. Newtok was not able to participate in this program because it is located in an unincorporated district in Alaska. GAO 2009, *supra* note 9, at 24; 44 C.F.R. § 78.12.

88. *See* 42 U.S.C. § 4001(e) (2006); 44 CFR § 60.3.

89. Alaska Admin. Order No. 175 (June 8, 1998), *available at* http://gov.state.ak.us/admin-orders/175.html.

funding to repair damaged infrastructure.[90]

The two remaining federal mitigation grant programs address non-flood-specific hazards and also have no regulatory process for the relocation of an entire community.[91] The first, the Pre-Disaster Mitigation (PDM) program, is an annual national competitive grant that provides limited funds for hazard mitigation planning and the implementation of mitigation projects prior to a disaster.[92] The second, the Hazard Mitigation Grant Program (HMGP), requires a presidential disaster declaration to access these funds.[93] In addition, only communities that have adopted a Hazard Mitigation Plan that has been approved by FEMA and the state where the community is located can receive this funding.[94] Application for these funds must be made within one year of the disaster[95] and can be used to implement long-term hazard mitigation measures, such as the elevation of flood prone structures; the relocation of individual structures out of the floodplain; natural hazard protective measures for power, water and sanitary sewer systems; and flood control projects.[96]

None of these mitigation grant programs includes a funding mechanism to facilitate a community-wide relocation effort. Nor do the programs have sufficient funds to

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90. *See infra* Part IV.C.
91. GAO 2009, *supra* note 9, at 20.
92. 42 U.S.C. § 5133 (2006).
93. *See generally* 44 C.F.R. §§ 206.430–440 (2009) (referring to the various requirements imposed on states that seek to receive HMGP funds following a presidential disaster declaration).
94. *See* 44 C.F.R. § 201.6 (2009).
95. 44 C.F.R. § 206.436(d).
96. *See* 44 C.F.R. § 78.12 (describing the eligibility criteria for projects for flood mitigation assistance funding); § 206.434(c)–(d) (describing eligibility for the HMGP, including the requirement that programs must "[c]ontribute[ ], to the extent practicable, to a long-term solution to the problem it is intended to address" and noting that eligible programs may include "[c]onstruction activities that will result in protection from hazards").

comprehensively address the erosion problems occurring in Alaskan Native villages.[97] Furthermore, the cost-effectiveness measures required by these laws often disadvantage Native villages seeking relocation. FEMA evaluates mitigation grant projects on the basis of the cost-effectiveness of the proposed project.[98] Because of the high construction costs, due to high transportation expenses, and the small populations in rural Alaska, village relocation projects have low benefit-to-cost ratios.[99] As a result, although communities like Newtok can apply for funding from the mitigation grant program to fund individual relocation projects, its small population and remote location create significant hurdles to winning a grant when competing with larger, urban communities.

Federal funding is also available through the HMGP to develop a Hazard Mitigation Plan. Mitigation planning requires a comprehensive risk assessment, which consists of three components: hazard identification, vulnerability assessment, and risk analysis.[100] The first step includes the identification and description of hazards.[101] Vulnerability assessments then identify the critical infrastructure in a community that is susceptible to damage by these hazards. Facilities are designated as critical if they are:

> (1) vulnerable due to the type of occupant (children or elderly for example); (2) critical to the community's ability to function (health clinics, transportation systems such as airways and roads, power generation facilities or water treatment facilities); (3) have a historic value to the community (cemetery); or (4) critical to the community in the event of a hazard occurring (emergency shelter, etc.).[102]

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97. *See* GAO 2009, *supra* note 9, at 24.
98. *Id.* at 22.
99. *Id.* at 22–23.
100. 44 C.F.R. § 201.4(c) (2009).
101. *Id.*; LOCAL HAZARDS MITIGATION PLAN, *supra* note 34, at 5.
102. LOCAL HAZARDS MITIGATION PLAN, *supra* note 34, at 7.

Finally, the risk assessment calculates the potential damage to this critical infrastructure to determine which hazards will have the greatest impact on the community.[103] This risk assessment requirement is intended to provide information that will help the community identify and prioritize mitigation activities to prevent or reduce losses from the identified hazards.[104] In addition, local mitigation plans must contain a cost-benefit analysis that examines the economic assessment of each mitigation action.[105] However, there is no requirement to continuously update the hazard mitigation plan as conditions change, although the regulations require that approved mitigation plans be reviewed at least every five years.[106] Thus, this option also does not take into account gradual environmental changes that necessitate a government response.

2.3.3 Conclusion

Post-disaster recovery and hazard mitigation laws provide the only statutory framework with which to respond to the climate-induced threats to Alaskan indigenous communities. Because these laws are designed to repair and replace damaged infrastructure in a community's original location, however, they focus on temporary displacement rather than permanent relocation. As described in greater detail in Part IV, these laws have impeded efforts to relocate communities and are inadequate to address the social and ecological crises occurring in Alaska. Newtok's relocation exemplifies the

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103. LOCAL HAZARDS MITIGATION PLAN, *supra* note 34, at 6. *See also* 44 C.F.R. § 201.4(c)(2)(iii) (noting that effective hazard mitigation plans should include "[a]n overview and analysis of potential losses to the identified vulnerable structures").

104. *See* LOCAL HAZARDS MITIGATION PLAN, *supra* note 34, at 6.

105. 44 C.F.R. § 201.6(c)(3)(iii) (2009).

106. 44 C.F.R. § 201.6(c)(4)(i) (2009).

need to amend these laws so that they are more responsive to the humanitarian crises created by climate change.

2.4 NEWTOK[107]

Newtok is a traditional Yup'ik Eskimo village, one of 229 federally recognized indigenous tribes[108] in Alaska, located close to the Bering Sea in far western Alaska.[109] The village's ancestors have lived on the Bering Sea coast for at least 2,000 years and are known as Qaluyaarmiut or "dip net people."[110] Today, the community thrives on subsistence foods, such as moose, salmon, musk ox, and seal.[111]

Small, isolated, and surrounded by water, the village of Newtok consists of a cluster

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107. Since February 2007, the author has attended approximately twenty-five meetings sponsored by tribal, state and federal government officials working to relocate Newtok. Two different government working groups are addressing Newtok's relocation: the Newtok Planning Group and the Immediate Action Workgroup, a working group of the Alaska Sub-Cabinet on Climate Change. Between February 2007 and December 2010, the author has attended approximately eighteen Newtok Planning Group meetings. Federal agencies represented at these meetings included the U.S. Army Corps of Engineers, Alaska District; the U.S. Department of Commerce, Economic Development Administration; the U.S. Department of Agriculture, Rural Development; the U.S. Department of Agriculture, Natural Resources Conservation Service; the U.S Department of Housing and Urban Development; the U.S. Department of the Interior, Bureau of Indian Affairs; the U.S Department of Transportation, Federal Aviation Administration; the U.S. Environmental Protection Agency, and the Denali Commission. State agencies participating in the meetings include the Alaska Department of Commerce, Community, and Economic Development, Division of Community & Regional Affairs, which is coordinating the Newtok Planning Group; the Alaska Department of Environmental Conservation's Village Safe Water Program; the Alaska Department of Transportation and Public Facilities; the Alaska Department of Military and Veterans Affairs/Division of Homeland Security and Emergency Management; the Alaska Department of Natural Resources, Division of Coastal and Ocean Resources; the Alaska Department of Education and Early Development; the Alaska Department of Health and Social Services; and the Alaska Industrial Development and Export Authority/Alaska Energy Authority. Agency participation at each meeting varied. The details of the Comprehensive Strategic Relocation Plan, including the decommission of the old village site, were discussed by various members of the Newtok Planning Group over the course of several meetings.

The author has also traveled to Newtok seven times since December 2007, most recently in December 2010, to observe the community relocation meetings, to administer a housing survey to understand the housing needs for the relocation and to observe the infrastructure development at the relocation site.

108. Indian Entities Recognized and Eligible to Receive Services from the United States Bureau of Indian Affairs, 73 Fed. Reg. 18,553, 18,557 (Apr. 4, 2008).

109. IAW 2008 RECOMMENDATIONS, *supra* note 14, at 17.

110. SALLY RUSSELL COX, AN OVERVIEW OF EROSION, FLOODING, AND RELOCATION EFFORTS IN THE NATIVE VILLAGE OF NEWTOK 2 (2007).

111. RurAL CAP, *supra* note 35, at 11–19.

of approximately sixty-three houses.[112] No roads lead to or from Newtok and there are no cars. The only year-round access to the community is by airplane, which seats a maximum of ten passengers. Food, supplies and basic necessities are carried to the community on these small planes.[113] Airplane travel to Newtok is completely unpredictable due to extreme weather conditions, from ground fog to hurricane-strength blizzards. Days can pass without any ability to travel to or from the community.[114] Barges travel to Newtok during the summer to bring fuel and other supplies too large or heavy to be carried by plane.[115] Extreme winter temperatures are common for the west coast of Alaska, where the mercury can plunge to two degrees Fahrenheit for weeks.[116] In the summer, temperatures hover around sixty degrees Fahrenheit and the earth becomes extremely muddy due to the melting permafrost. Wooden boardwalks connect all of the buildings.[117]

The community moved to its current site between the Ninglick and Newtok Rivers in 1950[118] when the Bureau of Indian Affairs (BIA) decided that the community needed a school.[119] The Newtok River provided a good landing site for the barge containing the

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112. U.S. CENSUS BUREAU, PROFILE OF GENERAL DEMOGRAPHIC CHARACTERISTICS: 2000, GEOGRAPHIC AREA: NEWTOK ANVSA, AK tbl.DP-1 (2000) [hereinafter NEWTOK DEMOGRAPHIC PROFILE], *available at* http://censtats.census.gov/data/AK/280027055.pdf.

113. *See supra* note 106.

114. *See supra* note 106.

115. *See* LOCAL HAZARDS MITIGATION PLAN, *supra* note 33, at 12–13, 22. *See also supra* note 106.

116. SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 7.

117. *See supra* note 106.

118. The community moved from Old Kealavik, which was across the Newtok River and approximately ten miles from the community's current location. ARCTIC SLOPE CONSULTING GROUP, NEWTOK TRANSPORTATION PLAN 1 (2001) [hereinafter NEWTOK TRANSPORTATION PLAN], http://www.commerce.state.ak.us/dca/planning/pub/Newtok_FINAL_Plan.pdf.

119. *Id.*; RurAL CAP, *supra* note 35, at 16.

construction materials and equipment to build the schoolhouse.[120] At the time of the move, approximately 100 people lived in the community, which consisted of houses made of sod or built using a simple frame.[121] The Holy Family Catholic Church was the only framed building and a dog team moved it to its current location using sleds.[122] The BIA built a school in Newtok's current location in 1958.[123]

Newtok's population has tripled since 1950, and inadequate housing has become a problem.[124] According to the 2000 Census, 321 people reside in the community[125] yet few homes have insulation to protect residents from the extreme cold.[126] Several homes are sinking into melting permafrost. Thawing permafrost and erosion are also preventing the community from building new homes to meet the needs of its population, causing a housing shortage.[127] None of the homes, many of which have only one or two rooms, has complete plumbing facilities.[128] Instead, most residents haul water or have water storage tanks.[129] Fresh water is pumped from a shallow tundra pond to a water treatment facility and storage tank.[130] The treated water is available to residents at a centrally located pumping station.[131] The last filling of the storage tank in fall must last through the winter, when Newtok's residents must rely on melted ice if water in the storage tank freezes or

120. RurAL CAP, *supra* note 35, at 16.
121. *Id.*
122. *Id.*
123. *Id.*
124. *See id.*
125. NEWTOK DEMOGRAPHIC PROFILE, *supra* note 111, at tbl.DP-1.
126. *See supra* note 106. These observations were made while conducting a home survey during the summer of 2009.
127. *See supra* note 106.
128. NEWTOK DEMOGRAPHIC PROFILE, *supra* note 111, at tbl.DP-4.
129. SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 5.
130. *Id.* at 11.
131. *Id.*

the tank is empty.[132]

The Newtok Traditional Council is the sole governing body for the community and has limited administrative and technical staff.[133] Stanley Tom is Newtok's current tribal administrator. Public infrastructure in Newtok includes a gravel airstrip, public laundry facility, tribal government office, post office, school, water treatment plant, and three stores.[134] However, store-bought food is extremely expensive due to transportation costs; one gallon of milk can cost over nine dollars.[135] Medical care is provided by a health aide at the Newtok Health Clinic.[136] Large cylindrical tanks store the fuel that powers and heats the community. The fuel storage facilities are close to the Newtok River to ease delivery by barge.[137]

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132. *Id.* at 6.

133. ARCTIC SLOPE CONSULTING GROUP, NEWTOK: BACKGROUND FOR RELOCATION REPORT 3–4 (2004) [hereinafter BACKGROUND REPORT]. *See also supra* note 106.

134. NEWTOK TRANSPORTATION PLAN, *supra* note 117, at 5, 13.

135. Kyle Hopkins, *Lacking Alternatives, Villagers Can't Kick Soda Habit*, ANCHORAGE DAILY NEWS, July 20, 2008, at A1.

136. SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 6.

137. *Id.* at 8–10.

2.4.1 Problems Caused by Climate Change

A combination of gradual ecosystem changes and rapid onset extreme environmental events is damaging public infrastructure in Newtok and endangering the lives and well-being of the village's inhabitants.

2.4.1.1 Ecological Changes

The community of Newtok sits on top of permafrost in the Yukon-Kuskokwim Delta, one of the largest river deltas in the world.[138] The permafrost is ice-rich and, in thaw periods, becomes muddy and has virtually no bearing capacity.[139] Marshy tundra and thousands of lakes surround the village. The Ninglick River borders the community to the south; to the east is the Newtok River.[140] Both rivers drain into the Bering Sea, located approximately ten miles to the west.[141] Newtok's close proximity to the Bering Sea makes the community highly vulnerable to flooding from tidal activity and storm surges.[142]

Unfortunately, erosion is changing the course of the Ninglick River, moving it closer to the village of Newtok. A combination of increased temperatures, thawing permafrost, wave action, and river current is accelerating the rate of erosion.[143] When the community moved to its current location in 1950, more than one mile separated the Ninglick River

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138. COX, *supra* note 109, at 2.
139. LOCAL HAZARDS MITIGATION PLAN, *supra* note 34, at 26–27.
140. SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 3.
141. *Id.* at 1, 3.
142. *Id.* at 10.
143. Multimedia Presentation, Sally Russell Cox, *An Overview of Erosion, Flooding, and Relocation Efforts in the Native Village of Newtok, Alaska*, http://www.commerce.state.ak.us/dcra/planning/NewtokOverview/index.html.

from the homes of community members.[144] Between 1954 and 2003, approximately three-quarters of a mile of tundra eroded in front of the village.[145] Efforts by the State of Alaska to control the erosion between 1983 and 1989 totaled approximately $ 1.5 million.[146] In spite of these efforts, according to the U.S. Army Corps of Engineers, the projected erosion of the Ninglick River toward Newtok will reach the school, the largest structure in the community, by approximately 2017.[147] The movement of the Ninglick River closer to the Newtok River has caused the Newtok River to become a slough in front of the community.[148] At low tide, the Newtok River appears similar to a mudflat.[149]

Six extreme weather events, occurring between 1989 and 2006, exacerbated these gradual ecological changes, five of which precipitated FEMA disaster declarations.[150] FEMA declared three disasters between October 2004 and May 2006 alone.[151] In October 2004, the Ninglick River and Bering Sea had not yet frozen when a powerful fall storm inundated the village.[152] In its disaster declaration, the state recognized that the storm would threaten the lives of Newtok's inhabitants and damage critical infrastructure, including power distribution, water and septic systems, and fuel storage tanks.[153] But the

144. RurAL CAP, *supra* note 35, at 13.
145. *See* COX, *supra* note 109, at 6.
146. SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 4.
147. U.S. ARMY CORPS OF ENG'RS, REVISED ENVIRONMENTAL ASSESSMENT: FINDING OF NO SIGNIFICANT IMPACT: NEWTOK EVACUATION CENTER: MERTARVIK, NELSON ISLAND, ALASKA 1 (2008) [hereinafter REVISED ENVIRONMENTAL ASSESSMENT], http://www.commerce.state.ak.us/dca/planning/pub/Newtok_Evacuation_Center_EA_&_FONSI_July_08.pdf.
148. SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 8.
149. *See supra* note 106.
150. *See* LOCAL HAZARDS MITIGATION PLAN, *supra* note 34, at 29–30 (describing previous incidents of floods and storm surges).
151. *Id.*
152. Cox, *supra* note 142.
153. *Id.*

severity and magnitude of the storm was beyond the recovery capability of local resources.[154] Then, in September 2005, a sea storm caused severe flooding that completely encircled Newtok, prompting a second FEMA disaster declaration.[155] Floating boardwalks were the only connection between several houses to the village.[156] Due to this early fall storm, Newtok residents were prevented from filling their sole water storage tank before the water supply from the tundra pond froze for the winter.[157] By early January 2006, Newtok inhabitants used the last stored water and had no easily accessible clean water supply.[158] In August 2006, the President declared the third disaster in less than three years because of flooding.[159] These three storms accelerated the rates of erosion and repeatedly "flooded the village water supply, caused raw sewage to be spread throughout the community, displaced residents from homes, destroyed subsistence food storage and other facilities, and shut down essential utilities."[160]

2.4.1.2 Community Impacts

These climate-induced ecological changes have significantly damaged or destroyed Newtok's public infrastructure, including the village dumpsite, barge ramp, sewage treatment facility, and fuel storage facilities.[161] In 1996, the village dumpsite eroded into the Newtok River.[162] A new dumpsite located across the Newtok River from the village,

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154. Disaster Declaration, 69 Fed. Reg. 70,466 (Dec. 6, 2004).
155. *See* LOCAL HAZARDS MITIGATION PLAN, *supra* note 34, at 30.
156. *Id.*
157. SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 11.
158. *Id.*
159. Disaster Declaration, 71 Fed. Reg. 47,239 (Aug. 16, 2006). *See also* LOCAL HAZARDS MITIGATION PLAN, *supra* note 34, at 30.
160. REVISED ENVIRONMENTAL ASSESSMENT, *supra* note 146, at 5.
161. SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 7–14.
162. LOCAL HAZARDS MITIGATION PLAN, *supra* note 34, at 12.

built as a short-term emergency response in 1996,[163] is still in use as of 2010.[164] Garbage gathers on the village side of the Newtok River and can only be transported by boat across the river at high tide.[165] The close proximity of the garbage collection point to the village is a nuisance to nearby residents because of the odor and scattered debris.[166]

In 2005, Newtok's primary barge landing eroded into the Ninglick River.[167] During the summer, barges customarily travel from the Bering Sea up the Ninglick River to Newtok to deliver essential supplies to the community. The loss of the barge landing, coupled with the diminished flow of the Newtok River, is an enormous hardship for the community. In April 2006, a fuel barge grounded for three days in the Newtok River, causing the barge company to severely restrict travel to Newtok.[168] Limited access by the summer barge has dramatically impacted the village's ability to receive cost-effective fuel delivery, thus straining power sources later in the year when the fuel runs out.[169] Without access to fuel, the community has no electricity.[170]

While building a new barge ramp is essential, a barge landing cannot be rebuilt at Newtok's current location because of erosion.[171] The community identified a relocation site where a new barge landing could be built. However, the Stafford Act requirements to

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163. *Id.*
164. *See id.* at 33–34 (indicating that the dumpsite was still in use at the time the report was written). *See also supra* note 106.
165. LOCAL HAZARDS MITIGATION PLAN, *supra* note 33, at 33.
166. *Id.* at 34.
167. SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 8.
168. *See* SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 8–10 ("Fall 2006 fuel deliveries were not made. The community is experiencing a fuel crisis.").
169. *See id.*
170. *See supra* note 106.
171. *See* LOCAL HAZARDS MITIGATION PLAN, *supra* note 33, at 32–33; BACKGROUND REPORT, *supra* note 132, at 10.

repair and rebuild at the original disaster location prevent using these resources to rebuild the barge landing at the relocation site.[172] The fuel tank storage facility is also severely deteriorated and subject to flooding.[173] Due to their condition, the U.S. Coast Guard will not allow the fuel tanks to be fully filled, which aggravates the problem of a limited cost-effective fuel supply for the village.[174]

Furthermore, Newtok lacks an adequate sewage disposal system.[175] The design of a solid waste master plan was deferred because of the community's decision to relocate and the government's reluctance to build new infrastructure in an existing floodplain and on thawing permafrost.[176] As a result, "honey buckets"—five-gallon buckets with plastic bag liners—are used in most homes in place of plumbing and sewage disposal.[177] Newtok residents dump raw sewage from the honey bucket into the Newtok River, located just adjacent to the community.[178] Because this section of the river has become a slough, the river is not able to flush the waste away from the village.[179] Raw sewage from the school is dumped into a sewage lagoon, an open-air pond between the school and the Newtok River.[180] Due to the lagoon's close proximity to the Newtok River, it is subject to

172. *See supra* Part III.
173. SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 13–14.
174. *Id.* at 13–14. *See also supra* note 106.
175. SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 11.
176. *See id.* at 20 ("Opportunities for replacing these lost or compromised components of the community are hindered by the rapidly deteriorating physical conditions at the site and by public investment policies that preclude investments of new infrastructure at Newtok because it is subject to flooding and erosion.").
177. *Id.* at 5.
178. *Id.* at 5–6.
179. COX, *supra* note 109, at 8.
180. SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 13.

flooding and leaks into an area residents use to dry subsistence fish.[181]

In addition to the problems with deteriorating infrastructure, saline intrusion impacts Newtok's access to potable water.[182] The U.S. Army Corps of Engineers estimates that erosion will consume the primary tundra pond providing water to the community "by 2016 or 2012, given an average and maximum erosion rate, respectively."[183] In 2006, the Yukon-Kuskokwim Health Center conducted a public health survey and found "sanitation conditions in Newtok to be grossly inadequate for public health protection."[184] Between 1994 and 2004, twenty-nine percent of Newtok infants were hospitalized with lower respiratory tract infections because of high levels of community contamination resulting from the lack of potable water for drinking, hygiene, and sanitation.[185] Washing hands regularly is a hardship with limited access to water.

The combination of increased climate-induced ecological hazards and the community's decision to relocate has severely limited capital investment in existing public infrastructure in Newtok.[186] The 2004, 2005, and 2006 FEMA disaster declarations released federal government funding to repair and replace community facilities destroyed during the storms.[187] Due to the statutory restrictions of the National Flood Insurance Program, however, government agencies are unable to use these funds to invest in

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181. *Id.*
182. *Id.* at 20.
183. *Id.*
184. *Id.*
185. Stanley Tom, Tribal Administrator, Newtok Traditional Council, Presentation to Immediate Action Workgroup (Nov. 6, 2007), http://www.climatechange.alaska.gov/docs/Newtok_6NOV07bww.pdf (citing TROY RITTER, MARK STAFFORD, JENNIFER DOBSON & SUZANNE EDELMAN, ENVIRONMENTAL PUBLIC HEALTH ASSESSMENT: NEWTOK, ALASKA (2006)).
186. LOCAL HAZARDS MITIGATION PLAN, *supra* note 34, at 34; SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 20.
187. LOCAL HAZARDS MITIGATION PLAN, *supra* note 34, at 30.

existing infrastructure in Newtok because of the current and expected future loss of, and damage to, these facilities due to their location in areas prone to flooding.[188] The hazard mitigation laws, written to protect people and infrastructure from flooding, require government agencies to defer construction in places susceptible to this environmental hazard.[189] As a consequence, Newtok's seriously deteriorated infrastructure could not be upgraded because the entire community was prone to flooding and there was no alternate location within the community to address the infrastructure needs of the existing village.[190]

At the same time, federal and state disaster recovery statutes also hindered use of the funding to build new infrastructure at Newtok's relocation site.[191] In January 2005, then-Governor Frank Murkowski enacted Administrative Order No. 224 which prioritized "the infrastructure needs of existing communities before consideration of proposals to create new communities, unless there is a congressionally directed relocation of an existing community."[192] Congress has not authorized the relocation of any community in Alaska and no federal agency has the authority to relocate a community.[193] Without

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188. *See* IAW 2008 RECOMMENDATIONS, *supra* note 13, at 51; BACKGROUND REPORT, *supra* note 132, at 11. *See also* Alaska Admin. Order No. 175, *supra* note 89 (requiring state-owned and state-financed construction projects to be sited and constructed in a manner that reduces the potential for flood and erosion damage); 42 U.S.C. § 4022(a)(1) (2006); ALASKA STAT. § 26.23.150 (2008); 44 C.F.R. § 60.3 (2009).

189. 42 U.S.C. § 4022(a)(1); ALASKA STAT. § 26.23.150.; 44 C.F.R. § 60.3.

190. *See infra* Part IV.A; IAW 2008 RECOMMENDATIONS, *supra* note 13, at 51; BACKGROUND REPORT, *supra* note 132, at 11.

191. *See* GAO 2009, *supra* note 9. *See also* IAW 2008 RECOMMENDATIONS, *supra* note 13, at 50–52.

192. Alaska Admin. Order No. 224 (Jan. 28, 2005), http://gov.state.ak.us/admin-orders/224.html.

193. *See* GAO 2009, *supra* note 9, at 24. Section 117 of the Energy and Water Development Appropriations Act of 2005 authorized the U.S. Army Corps of Engineers to be the lead agency for Corps-led proposals at Mertarvik and authorized the U.S. Army Corps of Engineers to relocate specific communities at full federal expense. Energy and Water Development

Congressional or federal agency relocation authority, state funding for Newtok's relocation has not been prioritized.[194] Relocation efforts are compartmentalized, which has led to delays in Newtok's relocation.[195] For these reasons, Newtok inhabitants continue to reside in a community with seriously deteriorated infrastructure that constitutes a severe public health risk.

2.4.2 Prior Studies Regarding this Crisis

State, federal, and tribal government and nongovernmental agencies have authorized numerous reports to document the socio-ecological crisis faced by Newtok residents and the habitability of the relocation site.[196] These reports serve as a model for the type of documentation needed to demonstrate that relocation is the only feasible solution to protect community residents from climate-induced ecological change. The Newtok Traditional Council (the Council) commissioned the oldest report, which was completed in 1984 and evaluated the impact of the Ninglick River's erosion impact on the community.[197] The Council commissioned a second erosion assessment in 2004.[198] The

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Appropriations Act of 2005, Pub. L. No. 108-447, § 117, 118 Stat. 2935, 2944–45 (2004). Despite this authority, no community was relocated between 2003 and 2009 when Section 117 authorized these actions. Instead, the U.S. Army Corps used these funds to conduct studies to determine the viability of relocation and to assess relocation sites. Section 117 addressed the limited issue of construction of infrastructure at relocation sites and did not provide any guidance regarding the relocation process for Newtok residents or the development of a comprehensive relocation strategic plan. In March 2009, Congress repealed this critical legislation that authorized the U.S. Army Corps of Engineers to take the lead in Newtok's relocation effort. Energy and Water Development and Related Agencies Appropriations Act of 2009, Pub. L. No. 111-8, § 117, 123 Stat. 601, 608 (2009). In the 2010 appropriations bill, the Corps received a new Alaska Coastal Erosion authority, which is the same as the prior Section 117 authority except that it requires cost sharing with a non-federal entity. Energy and Water Development and Related Agencies Appropriations Act of 2010, Pub. L. No. 111-85, § 116, 123 Stat. 2845, 2851.

194. SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 15. *See also* IAW 2008 RECOMMENDATIONS, *supra* note 13, at 50–52.

195. *See* SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 15.

196. *See id.* at 2–5 (describing previous studies).

197. VILL. OF NEWTOK, NINGLICK RIVER EROSION ASSESSMENT ADDENDUM (1984) (assessing causes and rates of Ninglick River erosion in proximity to the village of Newtok and

2004 Newtok Background for Relocation Report, prepared by Arctic Slope Consulting Group (ASCG), is the primary document guiding state and federal government agencies in Newtok's relocation process.[199] This report summarized the previous erosion studies, mapped the advancing Ninglick River to show the scope of erosion, documented the socio-ecological impacts of erosion on the village, and developed a tentative timeline for the short-term and long-term relocation of residences.[200] The report also described the Council's evaluation of each potential village relocation site, including "collocation" to one of four existing communities or relocation to one of six potential new sites in the region.[201] In addition, it contained the results of the 2003 resident survey, which asked Newtok residents to vote on relocation alternatives. [202]

Congress mandated two reports to assess the impact of erosion and flooding on Alaskan communities and the viability of relocation.[203] In 2003, the GAO evaluated the erosion and flooding impacts on nine Alaskan communities, including Newtok, and outlined possible solutions.[204] The second report, published in 2009, evaluated the progress made to protect communities from erosion and flooding and specifically evaluated the progress made to relocate communities.[205]

The U.S. Army Corps of Engineers also evaluated the habitability of Newtok's

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examining potential mitigation solutions, including relocation, which was found to be the most cost-effective solution to the erosion problems).

198. BACKGROUND REPORT, *supra* note 132.
199. *See id.*
200. *Id.* at 8–14.
201. *Id.* at 15–19.
202. *Id.* at 19.
203. GAO 2009, *supra* note 9; GAO 2003, *supra* note 32.
204. GAO 2003, *supra* note 32.
205. GAO 2009, *supra* note 9.

relocation site, named Mertarvik.[206] The studies include a 2002 site reconnaissance to evaluate the surface and subsurface conditions.[207] The Corps also performed an environmental assessment to evaluate wetlands, fish and wildlife and cultural resources, water quality and quantity, and erosion and flooding.[208] These studies confirm the findings of the Council that Mertarvik is a suitable relocation site.[209]

In addition, the U.S. Army Corps of Engineers funded two reports between 2005 and 2008 to evaluate Newtok's erosion problem and develop solutions.[210] The 2008 report analyzed five alternatives responses to the social and ecological crisis facing Newtok village residents.[211] These alternatives included: taking no action, staying in place with erosion and flood control, collocation, relocation funded and orchestrated solely by the Corps of Engineers, and a collaborative relocation effort.[212] The report found that a coordinated relocation effort was in the best interests of Newtok residents, explaining:

> With no Federal and state action, relocation efforts will be piecemeal and uncoordinated and will increase ultimate costs many times over a coordinated, efficient relocation plan. Local efforts will take many years and the existing

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206. SECTION 117 PROJECT FACT SHEET, *supra* note 14; REVISED ENVIRONMENTAL ASSESSMENT, *supra* note 146; U.S. ARMY CORPS OF ENG'RS, ALASKA VILLAGES EROSION TECHNICAL ASSISTANCE NEWTOK, ALASKA: PRELIMINARY RELOCATION PLANNING ANALYSIS (2006) [hereinafter PRELIMINARY RELOCATION PLANNING ANALYSIS] (documenting state and federal agency workshops held in December 2004 and September 2005 and presenting a preliminary timeline for planning and design tasks); U.S. ARMY CORPS OF ENG'RS, ALASKA VILLAGE EROSION TECHNICAL ASSISTANCE PROGRAM (2006) [hereinafter TECHNICAL ASSISTANCE PROGRAM] (providing preliminary cost estimates for the alternatives of relocation, collocation, and a stay-in-place solution).

207. U.S. ARMY CORPS OF ENG'RS, PRELIMINARY GEOTECHNICAL OVERVIEW (2002), http://www.commerce.state.ak.us/dca/planning/pub/2002_Prel_Geotechnical_COE.pdf.

208. SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 2.

209. *Id.*; REVISED ENVIRONMENTAL ASSESSMENT, *supra* note 146.

210. PRELIMINARY RELOCATION PLANNING ANALYSIS, *supra* note 205 (documenting state and federal agency workshops in December 2004 and September 2005 and presenting a preliminary timeline for planning and design tasks); TECHNICAL ASSISTANCE PROGRAM, *supra* note 205 (providing preliminary costs for the alternatives of relocation, collocation, and a stay-in-place colution).

211. SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 14–21.

212. *Id.*

> significant risk to health, life, and property will continue in Newtok. The disintegration of these people as a distinct tribe may result from splitting the community in two or more locations for many years as they relocate under their own efforts.[213]

The Corps also specifically rejected the collocation alternative, finding that "[c]ollocation would destroy the Newtok community identity."[214]

2.4.3 Newtok's Response to the Crisis

The community of Newtok tried responding to its rapidly changing environment with three strategies: erosion control, collocation to other established villages in the region, and relocation of the entire village to a new site. Erosion control failed and the tribe determined it was not a feasible long-term solution.[215] Collocation required Newtok residents to live in different communities separated by hundreds of roadless miles.[216] In a 2006 interview, Stanley Tom, the Tribal Liaison for the Newtok Traditional Council, stated, "We opposed that co-location 100 percent . . . our kids, our relatives—we're all relatives here—we want to be together as much as we can."[217] Believing that relocation of the entire community was the only option to protect community residents, the Council planned their community's relocation.[218]

The Council facilitated a three-pronged relocation process that involved the identification of a new village site location, Newtok resident voter approval of the

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213. *Id.* at 15.
214. *Id.* at 16.
215. BACKGROUND REPORT, *supra* note 132, at 12–13.
216. RurAL CAP, *supra* note 35, at 15.
217. *Id.*
218. *See* COX, *supra* note 109, at 3–4.

relocation site, and documentation to substantiate the need to relocate and the suitability of the relocation site for the community.[219] The Council began evaluating relocation sites in 1994.[220] The Council determined each site's habitability for the community by assessing the following criteria: "good soil foundation for village development, no erosion, land suitable for an airport, good barge access and access to subsistence."[221] The Council also wanted to make sure that their relocation site did not infringe on the subsistence areas of other villages.[222] Based on these criteria, the Council identified the appropriate relocation site, located nine miles away on Nelson Island.[223]

Newtok inhabitants voted three times—in September 1996, May 2001, and August 2003—and overwhelmingly chose to relocate to Nelson Island.[224] They also rejected any option to collocate to an existing village.[225] Nelson Island is the fifteenth largest island in the United States.[226] Tununak, Tooksook Bay, and Nightmute are the only three communities located on the island.[227] The total population of these indigenous communities is approximately 1,065 residents.[228] Seventy-seven percent of the island is

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219. BACKGROUND REPORT, *supra* note 132.
220. *See* COX, *supra* note 109, at 4.
221. There are no government standards to determine the suitability of the relocation site. BACKGROUND REPORT, *supra* note 132, at 16.
222. Author's observations, *supra* note 106.
223. COX, *supra* note 109, at 4.
224. BACKGROUND REPORT, *supra* note 132, at 19.
225. *Id.*
226. *List of Islands of the United States by Area*, WORLDLINGO, http://www.worldlingo.com/ma/enwiki/en/List_of_islands_of_the_United_States_by_area (last visited March 9, 2011).
227. U.S. CENSUS BUREAU, CENSUS SUMMARY FILE 1 (SF 1) 100-PERCENT DATA, BETHEL CENSUS AREA, NIGHTMUTE CITY, TOKSOOK BAY CITY, TUNUNAK CDP, ALASKA (2000), *available at* http://factfinder.census.gov.
228. *Id.*

uninhabited.[229] Newtok residents plan to relocate to a site on the northwestern part of the island, approximately forty miles from the nearest village on Nelson Island.[230] No roads lead to or from the relocation site.[231] No infrastructure exists at the site. Newtok residents named their relocation site "Mertarvik," a Yup'ik name that means "getting water from the spring."[232]

2.4.3.1 Land Acquisition for the Relocation

The federal government owned the Nelson Island relocation site, located within the Yukon Delta National Wildlife Refuge and managed by the U.S. Fish and Wildlife Service (USFWS).[233] To obtain ownership of this federal land, the Council first obtained support from Newtok's village corporation, the Newtok Native Corporation.[234] The Native Corporation then obtained support from the USFWS Regional Director, who, in December 1997, submitted an Intent to Exchange Agreement for the land exchange.[235] Congress authorized the land exchange and enacted legislation to that effect on

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229. *Nelson Island (Alaska)*, WORLD LINGO, http://www.worldlingo.com/ma/enwiki/en/Nelson_Island_(Alaska) (last visited March 9, 2011).

230. *See* REVISED ENVIRONMENTAL ASSESSMENT, *supra* note 146, at 5.

231. *Id.*

232. COX, *supra* note 109, at 4.

233. *See* Alaskan Native Village and the Interior Department Land Exchange, Pub. L. No. 108-129, 117 Stat. 1358 (2003) (codified as amended at 16 U.S.C. § 66dd (2006)) (describing the procedure by which the Newtok community can exchange ownership of their current land with that of the proposed relocation site).

234. The Newtok Native Corporation was created pursuant to the Alaska Native Claims Settlement Act, Pub. L. No. 92-203, 85 Stat. 688 (1971) (codified as amended at 43 U.S.C. §§ 1601–1629h (2006)) (ANCSA). This legislation created a corporate land title structure for indigenous lands. Section 8(a) of the Act requires indigenous tribes to organize as for-profit and nonprofit corporations in order to receive title to the surface and sub-surface land rights. 43 U.S.C. § 1607(a). These corporations formed on the regional and village level. § 1607(b). Section 14(c) of ANCSA establishes requirements for land distribution, received by the village corporation under ANCSA, to community residents. 43 U.S.C. § 1613. The village corporation is authorized to give to any occupants of the village the land used by that occupant as her home, primary place of business, or subsistence campsite as of December 18, 1971. § 1613(c).

235. COX, *supra* note 109, at 7.

November 17, 2003.[236]

The Newtok Native Corporation is now the landowner of the relocation site.[237] The Council is the sole governing authority working with state and federal government agencies to facilitate the community's relocation, but they have no legal title to the land. The Newtok Native Corporation and Council work closely with each other, but no process currently exists to determine how land will be selected and title transferred to both the Council and the new residents of Mertarvik for homes, businesses, or subsistence use.[238]

Legal control over the land is particularly important for the relocation process. The Council's efforts to secure funding for land use planning and infrastructure to be built at Mertarvik may require clear ownership of the land. Without an institutional framework to address property rights at the relocation site, it may be difficult for the Council to prove to potential funders that it has the authority to make decisions at the relocation site.[239]

2.4.3.2 Newtok Planning Group

The Newtok Planning Group was born in May 2006 from an ad hoc series of meetings.[240] Unique in its multi-disciplinary and multi-jurisdictional structure in Alaska, the Group consists of approximately twenty-five state, federal, and tribal governmental

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236. *Id.* at 20.

237. *Id. See also* Peter Van Tuyen, Addressing the Impact of Global Warming on Alaska Native Communities 2–3 (May 2007) (unpublished manuscript) (on file with author).

238. Van Tuyen, *supra* note 236, at 2–3.

239. *See* Van Tuyen, *supra* note 236, at 3 ("[W]ithout the land, or interest in such land, NTC is hamstrung in securing the resources necessary for such land use planning.").

240. GAO 2009, *supra* note 9, at 41. *See also* Denali Commission Planning Work Group, Meeting Notes, May 25, 2006, http://www.commerce.state.ak.us/dca/planning/pub/May_25_2006_meeting_notes.pdf.

and nongovernmental agencies that are all voluntarily collaborating to facilitate Newtok's relocation. The Alaska Department of Commerce, Community, and Economic Development (DCCED) is the lead coordinating Alaska state agency for comprehensive integrated planning initiatives like the Newtok Planning Group.[241] Governor Murkowski, in a 2006 state disaster declaration, directed this state agency to "act as the state coordinating agency to coordinate with other state and federal agencies to propose long-term solutions to the ongoing erosion issues in . . . affected coastal communities in this state."[242] There is no single federal authority designated as the lead coordinating agency for Newtok's relocation effort.[243]

Additional members of the Newtok Planning Group include the Native Village of Newtok, represented by the Newtok Traditional Council and the Newtok Native Corporation, seven Alaska state agencies,[244] the Alaska Governor's Office, the Lower Kuskokwim School District, nine federal agencies,[245] members of Alaska's

241. *See* SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 18.

242. Alaska Admin. Order No. 231 (Nov. 29, 2006), http://www.gov.state.ak.us/admin-orders/231.html.

243. GAO 2009, *supra* note 9, at 31.

244. The state agencies include the Alaska Department of Commerce, Community, and Economic Development, Division of Community & Regional Affairs, which is coordinating the Newtok Planning Group; the Alaska Department of Environmental Conservation Village Safe Water Program; the Alaska Department of Transportation and Public Facilities; the Alaska Department of Military and Veterans Affairs Division of Homeland Security and Emergency Management; the Alaska Department of Natural Resources, Division of Coastal and Ocean Resources; the Alaska Department of Education and Early Development; the Alaska Department of Health and Social Services; the Alaska Industrial Development and Export Authority; and the Alaska Energy Authority.

245. Federal agencies include the U.S. Army Corps of Engineers, Alaska District; the U.S. Department of Commerce, Economic Development Administration; the U.S. Department of Agriculture, Rural Development; the Natural Resources Conservation Service; the U.S. Department of Housing and Urban Development; the U.S. Department of the Interior, Bureau of Indian Affairs; the U.S Department of Transportation, Federal Aviation Administration; the U.S. Environmental Protection Agency; and the Denali Commission.

Congressional delegation, and four regional nonprofit organizations.[246] Three sub-committees—housing, transportation, and utilities—address the critical infrastructure to be built at Mertarvik.

2.4.3.2.1 Governance Framework of the Newtok Planning Group

From the Newtok Planning Group's inception, the Council has led the relocation effort. Statements and actions of state and federal agency representatives have repeatedly affirmed the importance of working with the Council.[247] The leadership of the Newtok Traditional Council has been a key element of the success of the relocation process. The Newtok Traditional Council has made all of the decisions related to the community's relocation effort, including choosing the relocation site with resident voter approval, designing the community layout plan and infrastructure with resident approval. However, no state or federal statutes or regulations govern or guide the Planning Group's work. Instead, the Newtok Planning Group is guided only by their collective desire to provide technical assistance to the Newtok Traditional Council.

While the Newtok Planning Group has made significant progress toward Newtok's relocation, the policy and practical challenges have been enormous. The limitations of existing federal and state statutes and regulations, such as the post-disaster recovery

246. The four regional nonprofit organizations are the Association of Village Council Presidents Regional Housing Authority, the Coastal Villages Region Fund, the Rural Alaska Community Action Program, and the Yukon-Kuskokwim Health Corporation. *See supra* note 106.

247. *See, e.g.*, Newtok Planning Group, Meeting Notes, Aug. 17, 2006 (noting that one participant "stressed the need to keep the Newtok Traditional Council in a key role"), http://www.commerce.state.ak.us/dca/planning/pub/August_2006_meeting_notes.pdf.

legislation, have impeded their efforts.[248] When a storm destroyed Newtok's barge landing in 2005 and federal funding was released due to a federal disaster declaration, for instance, these funds could not be used to build a new barge landing at the relocation site.[249] In addition, due to the multi-disciplinary nature of the working group, that agency representatives have had to educate each other about the laws that govern their work and the funding options and limitations available within each agency.[250] For example, an airstrip needs to be built at the relocation site, and the Federal Aviation Administration has particular requirements regarding proximity to community infrastructure.[251] Sharing this information was critical in order to determine the appropriate community layout plan.[252]

While coordination between the agencies that comprise the Newtok Planning Group has been critical, funding limitations have made it extremely difficult to facilitate this coordination.[253] In fact, not one agency involved in Newtok's relocation has funding designated for relocation:

[T]he Newtok experience [shows] that there are so many unknowns that it's . . .

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248. *See* IMMEDIATE ACTION WORKGROUP, RECOMMENDATIONS TO THE GOVERNOR'S SUBCABINET ON CLIMATE CHANGE 69 (2009) [hereinafter IAW 2009 RECOMMENDATIONS], http://www.climatechange.alaska.gov/docs/iaw_finalrpt_12mar09.pdf (noting that "state and federal disaster statutes require that all other possibilities be exhausted before relocation is considered").

249. Immediate Action Workgroup, Meeting Summary, Jan. 18, 2008, at 5, http://www.climatechange.alaska.gov/docs/iaw_18jan08_sum.pdf. *See supra* note 106.

250. *Id.* at 7 (discussing the "need to coordinate with different agencies and determine specific details of a community's plan" as well as "know all the funding streams and how to coordinate access").

251. *See* Newtok Planning Group, Meeting Notes, Jan. 10, 2008 (describing discussion over placement of airstrip), http://www.commerce.state.ak.us/dca/planning/npg/pub/NPG_Mtg_Notes_1-10-08.pdf.

252. *See supra* note 106.

253. *See* IAW 2009 RECOMMENDATIONS, *supra* note 247, at 75 (lamenting that "current funding streams neither require nor enable comprehensive analysis of comparative costs, of critical path for construction, or identifying potential conflicts with other projects").

> very difficult to track information and to project and plan for what's needed with the relocation effort. Funding sources are iffy and difficult to get a handle on who is going to fund and what the requirements of the project [are] and what agencies' requirements are. Everyone has a different tracking system and so the site is being developed piecemeal.[254]

Moreover, every aspect of the relocation requires state and federal agencies to identify and secure funding in phases and to coordinate their funding efforts, including sharing equipment costs and coordinating its usage. The Newtok Planning Group has been extremely creative in their use of existing revenue sources, employing funds generally available for community projects throughout Alaska to put the relocation puzzle together. Using existing funding sources to facilitate Newtok's relocation has enabled the relocation effort to move forward but has also contributed to its slow progress. Newtok's relocation is remarkable given these enormous constraints.

2.4.3.2.2 Community Relocation Plan

By the time of the first Newtok Planning Group meeting in May 2006, Newtok was clearly in crisis. Erosion was claiming seventy feet of land annually, the community had major floods in September 2005 and May 2006, critical public infrastructure was lost or severely damaged, and access to the community was extremely limited due to the loss of the barge landing in 2005.[255] The community was also in the midst of a public health crisis.[256] The state, federal, and nonprofit agency representatives recognized that these

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254. Immediate Action Workgroup, Meeting Summary, Jan. 18, 2008, at 7, http://www.climatechange.alaska.gov/docs/iaw_18jan08_sum.pdf.

255. SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 8–14. *See also supra* Part IV(A)(2).

256. Tom, *supra* note 184.

factors created a complex emergency and that the community needed immediate action. Not knowing whether community residents would be able to go to a safe location within the community in the event of another extreme environmental event, the Newtok Planning Group discussed the possibility of evacuating Newtok residents to Anchorage and Fairbanks, the largest urban areas in Alaska, located hundreds of roadless miles to the east of Newtok.[257]

The Newtok Planning Group eventually shifted its focus from long-distance community evacuation plans and devised a strategy to meet the community's immediate and long-term needs at the same time. The creation of this strategy was an intense multi-year process and has demonstrated the complexity of the relocation process.

The design and development of a comprehensive relocation plan was an essential first step in Newtok's relocation effort. However, because no funding is specifically available for relocation, the Newtok Planning Group has had to compartmentalize their efforts instead of executing one streamlined relocation plan. The agencies involved used existing revenue sources within the mandate of their respective agencies to fund specific projects within the initial relocation community layout plan. As a result, Village Safe Water, the state agency dedicated to the design and construction of sanitation systems in rural Alaska, applied for and received funding in 2006 to focus exclusively on creating a water, sewer, and solid waste master plan in Mertarvik.[258] Understanding the need to

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257. Denali Commission Planning Work Group, Meeting Notes, May 25, 2006, at 1, http://www.commerce.state.ak.us/dca/planning/pub/May_2006_meeting_notes.pdf.

258. *See* GAO 2009, *supra* note 8, at 30 (noting that the "completion of a preliminary layout of water and sewer infrastructure by the Alaska Department of Environmental Conservation's Village Safe Water Program" was a sign of "significant progress"); Newtok Planning Group, Meeting Summary, June 9, 2006, at 4,

create a comprehensive relocation strategy, Village Safe Water also hoped this funding would provide time for other agencies "to identify and secure funding" for the non-sanitation components of the relocation plan.[259]

Several months later, the Alaska Department of Commerce, Community, and Economic Development Division of Community & Regional Affairs (DCRA) received funding to supplement the Village Safe Water work by developing a comprehensive community layout plan to determine the specific location of homes and public infrastructure.[260] This funding also allowed state representatives to travel to Newtok in December 2007 to facilitate the first community meeting to discuss the Mertarvik Community Layout Plan.[261] Residents thus also contributed to the plan by expressing their ideas about the location of community infrastructure and for the design of the physical layout of Mertarvik.

The community layout process also involved interviews with key agency representatives, many of whom expressed concern about the financing and cost of capital investment in the new village and the village's ability to fund ongoing operations and maintenance.[262] Some agencies also expressed concern that only some villagers would

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http://www.commerce.state.ak.us/dca/planning/pub/June9_Newtok_meeting_summary.pdf; Newtok Planning Group, Meeting Summary, Dec. 11, 2006, at 1, http://www.commerce.state.ak.us/dca/planning/pub/December_2006_meeting_notes.pdf.

259. Newtok Planning Group, Meeting Summary, June 9, 2006, at 4–5, http://www.commerce.state.ak.us/dca/planning/pub/June9_Newtok_meeting_summary.pdf.

260. E-mail from Sally Cox, Planner, Alaska Dep't of Commerce, Community, and Economic Development, to Robin Bronen (November 20, 2007) (on file with author).

261. Approximately fifty village residents attended this first meeting, which occurred in the village school. Elders, children and their parents participated in the creation of the first community layout plan at Mertarvik. The following morning, meetings occurred with fourth and fifth grade students to invite their ideas about the future community layout. *See supra* note 106 (including the author's observations at the December 2007 meeting).

262. Newtok Planning Group, Meeting Notes, Jan. 10, 2008, at 1, http://www.commerce.state.ak.us/dca/planning/pub/NPG_Mtg_Notes_1-10-08.pdf.

move to the new site, "resulting in two permanent settlements that would require community facilities at both sites."[263] Without statutory guidance for the relocation process, these critical policy and practical issues remain unresolved.

2.4.3.2.3 Creating Village Infrastructure At the Relocation Site

The Newtok Planning Group has been engaged in a multi-year effort to determine the type of primary infrastructure to be built at Mertarvik. Planning efforts have focused on the design and construction of infrastructure that can serve the dual purpose of providing both emergency evacuation facilities and the first permanent infrastructure for the relocation effort. To meet these objectives, the Newtok Planning Group decided that an evacuation center, barge landing, staging area, and an access road connecting the barge landing to the evacuation center needed to be the first infrastructure built at Mertarvik.[264]

Seven different federal, state, and tribal entities are involved with the construction of these facilities, but no agency is authorized as the lead supervisor of the project.[265] The DCCED and the Council both applied for and received funding from the U.S. Department of Commerce Economic Development Administration in October 2006 to build a barge landing and staging facility at Mertarvik.[266] The Alaska Department of Transportation and Public Facilities (DOT) provided additional funding to satisfy the state matching requirement. Although the DCCED received funding for the barge facility, the agency

263. *Id.* at 2.
264. *See supra* note 106.
265. Newtok Planning Group, Mertarvik Barge Landing and Staging Area, http://www.commerce.state.ak.us/dca/planning/BargeLanding.htm (last visited Dec. 16, 2010).
266. *Id.*

has no statutory construction authority and was unable to assume fiscal responsibility for the project because of an insurance and bonding requirement.[267] Yet the agency did not realize this limitation until after the funding was awarded.[268] To resolve this issue, DCCED signed a Memorandum of Agreement with DOT to transfer the funds to DOT. Pursuant to this agreement, DOT assumed construction authority of the barge landing and DCCED lost the ability to control the timing of the construction of the barge landing.[269]

The U.S. Army Corps of Engineers then planned and designed the road connecting the barge landing to the evacuation center pad, with construction performed by the State of Alaska.[270] The U.S. Department of Defense Innovative Readiness Training Program (IRT) plans to assist with the construction.[271] The IRT is a military program to improve military readiness while simultaneously providing services to communities throughout the United States. The IRT has made a five-year commitment to Newtok's relocation effort.[272] During the summer of 2009, the DOT built the barge landing and the U.S. military built the staging area to prepare for the construction of the road during the summer of 2010.[273] This complicated process represents just one of many collaborations necessary under the existing statutory requirements to implement the relocation of Newtok.

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267. Robin Bronen, Notes from Newtok Planning Group Meeting, May 2009 (on file with author).
268. *Id.*
269. *Id.*
270. REVISED ENVIRONMENTAL ASSESSMENT, *supra* note 146, at 7–8.
271. Press Release, Alaska Dep't of Commerce, Cmty. & Econ. Dev., Reserve Marines Support Join Relocation Effort (Aug. 14, 2009), http://www.commerce.state.ak.us/dcra/pub/Mertarvik_IRT_Visit_Media_Advisory_August_14_2009.pdf.
272. *Id.*
273. *See supra* note 106.

2.4.3.2.4 Compliance with Governmental Environmental Permitting Regulations

Compliance with the National Environmental Protection Act (NEPA) is one of the most significant challenges to Newtok's relocation and has delayed its inception and progress.[274] NEPA requires an environmental assessment or environmental impact assessment (EIS), depending on the magnitude of the anticipated impact on the environment, to evaluate the likely environmental effects of proposed construction projects undertaken with federal money.[275] If two or more federal agencies are involved in the same project or involved in a group of projects directly related to each other, NEPA regulations require that a lead agency supervise the preparation of the environmental assessment or environmental impact statement.[276]

NEPA has impeded Newtok's relocation for several reasons. First, while the U.S. Army Corps of Engineers is the lead agency for funding and planning the design and construction of the new evacuation center, there is no designated federal lead agency for the overall relocation of the village, as is required in order to comply with NEPA.[277] Some of the participants in the Newtok Planning group fear that, without a lead agency dedicated to Newtok's relocation, none of the agencies involved will undertake the legal obligations outlined in NEPA for the village relocation.[278] Furthermore, agencies involved in the Newtok Planning Group are uncertain as to which agency has the

274. GAO 2009, *supra* note 9, at 31.
275. *See* 42 U.S.C. § 4332(2)(C) (2006); 40 C.F.R. §§ 1508.9, 1508.11 (2009).
276. GAO 2009, *supra* note 9, at 31.
277. *Id.*
278. *Id.*

resources to take the lead.[279]

The federal agencies involved with the Group have also struggled with the scope of the impact assessment. There is no precedent for NEPA's application to the relocation of an entire community.[280] With no funding to create a strategic relocation plan, the Newtok Planning Group took several years to determine the first infrastructure to be built at the relocation site and, until a federal project was identified, no agency could initiate the development of a NEPA document.[281] These challenges were compounded by the lack of designated funding to complete the EIS and the severe time constraints due to the ecological threats facing the community under which the EIS needed to be completed so that Newtok could move forward with its relocation.[282]

2.4.3.2.5 Conclusion

Newtok's relocation presents acute challenges to traditional governance institutions. With no statutory guidance or authority to relocate the village, the Newtok Planning Group has engaged in an ad hoc process that has strained the individual and collective capacity of governmental and nongovernmental agencies to respond to the complex

279. Multiple meetings occurred with the NEPA experts from several different federal agencies involved in Newtok's relocation, including the Environmental Protection Agency, the Alaska District Army Corps of Engineers, the Department of Housing and Urban Development, the Department of Agriculture Rural Development, the Federal Aviation Administration, and the Department of Commerce to develop a strategy to comply with NEPA at the new village site. Discussions focused on which federal agency will do the EIS to determine the cumulative effect of relocation . *See supra* note 106 (including author's observations from the November 27, 2007 NEPA Meeting).

280. Van Tuyen, *supra* note 236, at 3.

281. *See supra* note 192.

282. IAW 2009 RECOMMENDATIONS, *supra* note 247, at 5; GAO 2009, *supra* note 8, at 31; Newtok Planning Group, Meeting Summary, Sept.24, 2007 at 3–4 *available* at http://www.commerce.state.ak.us/dca/planning/pub/Sept_24_2007_Meeting_Notes.pdf.

humanitarian crisis. Newtok's relocation has been particularly challenging because the traditional governmental responses to extreme environmental events, such as post-disaster recovery and hazard mitigation, have not provided any statutory guidance or funding mechanism to assist with Newtok's relocation. In addition, no institutional framework exists within the United States to relocate an entire community. As a consequence, national, state, local, and tribal government agencies lack the legal authority to relocate communities. These agencies also lack the technical, organizational, and financial capacity to implement a relocation process for communities forcibly displaced by climate change. The absence of legal authority and a relocation organizational structure have been significant barriers to Newtok's relocation and have exacerbated the humanitarian crisis faced by the community.

2.5 Creating an Adaptive Governance Response, Based in Human Rights Doctrine, to Climate-Induced Population Displacement

Federal and state statutes need to be enacted to create an adaptive governance framework to respond to the type of climate-induced community relocation occurring in Newtok. A relocation statutory framework must create two primary organizational instruments: a relocation policy framework and an adaptive governance structure. The relocation policy framework provides the overarching principles and objectives necessary for an effective climigration adaptive governance structure. Relocation requires new multi-level and multi-disciplinary relationships between federal, state, local, and tribal government actors in order for them to work in concert. Thus, the relocation policy framework must clearly outline the roles and responsibilities of governmental and

nongovernmental agencies and the mechanisms that will release funding and technical assistance to communities.

2.5.1 Relocation Policy Framework

A relocation policy framework defines the human rights principles and objectives that govern the relocation process to determine when relocation occurs to protect the life and well-being of community residents, the steps governmental and nongovernmental agencies must take to implement a relocation process, the organizational arrangements between multi-sectoral governmental and nongovernmental agencies, and the funding mechanisms for relocation. The necessary steps toward relocation include a community's socio-ecological assessment documenting that relocation is warranted, a community-wide vote or survey demonstrating community commitment to relocate, and a relocation site selection process which includes community approval of the site chosen. Culturally and linguistically appropriate mechanisms for participation and consultation are fundamental components of the relocation process.

In addition, nation state governments need governance tools as well as the technology to respond to climigration. As a consequence, the international community needs to assist nation state governments to build their capacity to respond through a broad range of adaptation strategies, including community relocation. Community relocations should only occur when there are no other durable solutions.

2.5.1.1 Human Rights Principles

The humanitarian crisis in Alaska clearly demonstrates that human rights principles must be embedded in the relocation policy framework so that governments protect and assist communities forced to relocate due to climate change.[283] Severe economic, social, and environmental consequences can occur in the relocation process. Relocation can unravel the fabric of a community, weaken community institutions and social networks, disrupt subsistence and economic systems, and impact the cultural identity and traditional kinship ties within a community.[284] A relocation policy framework based in human rights doctrine is essential in order to avoid or minimize these adverse impacts and to ensure a community's resilience after relocation.

First, the United Nations should convene an expert working group to develop Guiding Principles on Climigration which includes United Nations agencies and non-governmental organizations focused on disaster risk reduction, humanitarian aid, human rights and internal population displacement issues.[285] While the Convention Relating to

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283. *See generally* Robin Bronen, *Forced Migration of Alaskan Indigenous Communities Due to Climate Change: Creating a Human Rights Response*, *in* LINKING ENVIRONMENTAL CHANGE, MIGRATION, AND SOCIAL VULNERABILITY 68 (Anthony Oliver-Smith & Xiaomeng Shen eds., 2009) (analyzing the reasons to create a human rights framework to respond to climigration and the reasons the 1951 UN Convention Relating to the Status of Refugees should not be expanded to include climigration).

284. *See* Ian Johnson, *Foreword* to WORLD BANK, INVOLUNTARY RESETTLEMENT SOURCEBOOK xvii, xvii (2004) (outlining guidelines on population resettlement caused by government or government-supported actors who displace populations to construct infrastructure projects, such as dams). Unfortunately, the World Bank guidelines do not outline the institutional requirements for population resettlement, but do not incorporate any human rights protections.

285. The United Nations has convened expert working groups in the past to analyze and develop human rights principles on a variety of issues, including housing and restitution and internal displacement. *See* CTR. ON HOUS. RIGHTS & EVICTIONS, THE PINHEIRO PRINCIPLES 4 (2007), http://www.unhcr.org.ua/img/uploads/docs/PinheiroPrinciples.pdf; WALTER KÄLIN, GUIDING PRINCIPLES ON INTERNAL DISPLACEMENT: ANNOTATIONS 4, 7 (2008), http://www.asil.org/pdfs/stlp.pdf. The United Nations is the most appropriate forum because climigration will affect populations all over the world and the principles need to be relevant to all

the Status of Refugees,[286] the Universal Declaration of Human Rights,[287] the International Covenant on Civil and Political Rights (ICCPR),[288] the International Covenant on Economic, Social, and Political Rights (ICESCR),[289] the Guiding Principles on Internal Displacement,[290] and the Universal Declaration on the Rights of Indigenous Peoples[291] provide a theoretical basis for creating these principles, none of these legal documents addresses the complex and unique social, economic, and political crises of populations facing climigration. For example, international legal doctrine relating to refugees is based on the fundamental principle that a person needs legal protection because she is outside of her country of origin due to persecution by a government actor or an actor the government cannot control.[292] The laws also often anticipate that refugees cannot turn to their own governments for protection because nation states are commonly the source of

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those affected by climate-induced ecological change that affects the habitability of communities.

286. Convention Relating to the Status of Refugees, *opened for signature* July 28, 1951, 19 U.S.T. 6223, 189 U.N.T.S. 150.

287. Universal Declaration of Human Rights, G.A. Res. 217 (III) A, U.N. Doc. A/RES/217(III) (Dec. 10, 1948).

288. International Covenant on Economic, Social and Cultural Rights, *opened for signature* Dec. 16, 1966, G.A. Res. 2200A (XXI), U.N. GAOR, 21st Sess., Supp. No. 16, U.N. Doc. A/6316 (1966), 993 U.N.T.S. 3 (entered into force Jan. 3, 1976) [hereinafter ICESCR].

289. International Covenant on Civil and Political Rights, *opened for signature* Dec. 16, 1966, G.A. Res. 2200A (XXI), U.N. GAOR, 21st Sess., Supp. No. 16, U.N. Doc. A/6316 (1966), 993 U.N.T.S. 3 (entered into force Mar. 23, 1976).

290. U.N. Comm'n on Hum. Rts., *Guiding Principles on Internal Displacement*, U.N. Doc. E/CN.4/1998/53/Add.2 (Feb. 11, 1998) [hereinafter *Internal Displacement Principles*].

291. United Nations Declaration on the Rights of Indigenous Peoples, G.A. Res. 61/295, U.N. Doc. A/RES/61/295 (Sept. 13, 2007).

292. *See, e.g.*, Convention Relating to the Status of Refugees, *supra* note 285, at art. 1 (defining a refugee as a person who, "owing to well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country; or who, not having a nationality and being outside the country of his former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it").

their persecution.[293] Human rights protections thus attach to refugee movements because of the nation state government's failure to protect its citizens. In comparison, the international community should expect that nation state governments would want to protect their citizenry from climate-induced ecological changes. In fact, nation state governments have a duty to protect their citizens from these changes.[294] The Guiding Principles on Internal Displacement provide the closest analogue to climigration, as most scholars predict that climate change will predominantly cause internal as opposed to international migration and they include victims of natural disasters.[295] Yet these principles are also not adequate to respond to the complex issues and human rights implications of climigration for several reasons. First, the Principles are based primarily on population displacement caused by ethnic and political violence.[296] Second, emergencies are clearly different from planned relocations. The Guiding Principles do not provide for the prospective needs of populations planning their permanent relocation and do not provide any guidance on how communities can sustain themselves and create the

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293. *See, e.g., id.* (defining a refugee as a person who is "unwilling to avail himself of the protection" of his country).

294. BROOKINGS-BERN PROJECT ON INTERNAL DISPLACEMENT, HUMAN RIGHTS AND NATURAL DISASTERS 7 (2008), http://www.reliefweb.int/rw/lib.nsf/db900sid/KHII-7EE9KM/$file/brookings_HR_mar08.pdf. *See also* James C. Hathaway, *Reconceiving Refugee Law as Human Rights Protection*, 23 J. REFUGEE STUD. 113, 122 (1991).

295. INT'L ORG. FOR MIGRATION, MIGRATION, ENVIRONMENT AND CLIMATE CHANGE: ASSESSING THE EVIDENCE 329 (2009).

296. *Internal Displacement Principles*, *supra* note 290 (outlining the responsibilities of nation state governments not to discriminate against or marginalize populations which are internally displaced and also not to cause arbitrary displacement of populations). The Annotations to the Guiding Principles specifically state that "[v]ictims of disasters are included as experience shows that they also can, as a consequence of their displacement, become victims of human rights violations such as discrimination (e.g., because they have to move to an area where they constitute an ethnic minority), sexual and gender based violence (e.g., in overcrowded camps), or disregard of their property rights." Kälin, supra note 284, at 4, 7.

necessary infrastructure to provide for basic necessities without the assistance of humanitarian aid.[297] The principles do not address the fundamental right to food, water and housing that need to be part of a planned relocation process. Most importantly, the Principles do not clearly define a mechanism for communities to make the decisions regarding the process of relocation.[298] A human rights protocol that addresses climigration must ensure the protection of collective rights because climate change impacts the habitability of entire communities whose residents will be forced to permanently relocate. These rights include the collective right to relocate as a community, as well as the collective right to make decisions regarding where and how a community will relocate.

Next, all relocation policy frameworks should include a set of Guiding Principles on Climigration affirming key human rights principles. These principles include the right to relocation when climate-induced ecological change threatens the lives of community residents and traditional methods of erosion control and flood relief cannot provide protection;[299] the right to life, which mandates a nation state government to protect its citizenry from climate-induced ecological threats;[300] and the right to self-determination[301]

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297. Internal Displacement Principles, supra note 290; Brookings-Bern Project on Internal Displacement, Human Rights and Natural Disasters 33 (2008), http://www.reliefweb.int/rw/lib.nsf/db900sid/KHII-7EE9KM/$file/brookings_HR_mar08.pdf.

298. Internal Displacement Principles, supra note 290.

299. *See* Mathias Risse, *The Right to Relocation*, 23 ETHICS & INT'L AFF. 281 (2009) (arguing that there should be a right to relocation).

300. Universal Declaration of Human Rights, *supra* note 286; Human Rights Committee, *General Comment No. 6: The Right to Life*, ¶ 5, U.N. Doc. HRI/GEN/1/Rev.7 (Apr. 30, 1982) (requiring States to adopt positive measures to protect the "inherent right to life"). The government of the Maldives, for example, has interpreted the human right to life mean that the government has the responsibility to protect its citizens from life-threatening situations caused by climate change. *See* REPUB. OF MALDIVES, HUMAN RIGHTS COUNCIL RESOLUTION 7/23: "HUMAN RIGHTS AND CLIMATE CHANGE": SUBMISSION OF THE MALDIVES TO OHCHR STUDY 6 (2008),

to empower communities during the relocation process and ensure that the relocation is community-based and community-guided. In order to further this last principle, affected communities must be designated as key leaders in the relocation process.

Third, Guiding Principles on Climigration must protect the social, economic, and cultural human rights—defined in the U.N. International Covenant on Economic, Social, and Cultural Rights[302]—of individuals and the communities forced to relocate because of climate change. These rights must be protected during displacement as well as relocation.[303] The relocation process must ensure that socio-cultural institutions remain intact.[304] Families and tribes must remain together during the relocation process. If tribes are not able to remain together, the tribes must decide who relocates and how tribe members relocate. For indigenous communities, tribal relationships are essential to cultural identity. Subsistence rights and customary communal rights to resources must

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http://www.maldivesmission.ch/fileadmin/Pdf/Environment/Maldives_Submission_FINAL_250908_01.pdf.

301. The U.N. Declaration on the Rights of Indigenous Peoples, *supra* note 288, at Articles 1, 5,10, 18 & 33, affirms the right of indigenous communities to make collective decisions affecting their fundamental human rights. In addition, Article 1 of the International Covenant on Civil and Political Rights specifically establishes that "all peoples have the right of self-determination" by virtue of which "they freely determine their political status and freely pursue their economic, social and cultural development." International Covenant on Civil and Political Rights, art. 1(1), Dec. 16, 1966, 999 U.N.T.S. 171 (entered into force Mar. 23, 1976).

302. ICESCR, *supra* note 288.

303. KÄLIN, *supra* note 284, at 1 (recognizing the need to protect people's human rights during displacement in addition to after the displacement has occurred).

304. The U.S. Army Corps of Engineers relied on a 2005 anthropological study to negate collocation as an appropriate response to the socio-ecological crisis affecting Newtok residents. The study examined the cultural impacts of the collocation of the residents of Shishmaref, an Alaskan indigenous community also facing climate-induced relocation. The study concluded that many aspects of culture (for example, language, dancing, festivals, carving and sewing, and cultural values), as well as subsistence practices and lifestyles, would be adversely affected in some way by collocation. *See* U.S. ARMY CORPS OF ENG'RS, COASTAL EROSION PROTECTION AND COMMUNITY RELOCATION: SHISHMAREF, ALASKA, COLLOCATION CULTURAL IMPACT ASSESSMENT 146 (2005). The U.S. Army Corps of Engineers found that "the unique Newtok tribe would be lost" if collocation occurred and that "the increased population would result in a lack of housing, overcrowded schools, stress on utilities and other infrastructure, high unemployment, and strain on local subsistence." SECTION 117 PROJECT FACT SHEET, *supra* note 14, at 16.

also be affirmed.

The relocation policy framework must also create the opportunity to improve livelihoods and standards of living while implementing sustainable development strategies as part of the relocation process. Relocation should not diminish the living standards of the affected communities.[305] The Guiding Principles on Climigration would affirm the already-recognized rights to safe and sanitary housing,[306] potable water, [307] and other basic amenities.[308] Embedding these principles in the relocation policy framework will enhance the resiliency of communities by addressing socio-economic issues, such as lack of economic development and poverty, which can contribute to the vulnerability of communities.

The human rights of host communities must also be protected. A protocol to respond to climigration must also ensure that human rights protections are extended to those living in communities that provide sanctuary for those displaced by climate change. Host populations may experience shortages of water, sanitation, shelter, and essential health services as a result of the increase in population.[309] Schools may also be overburdened to provide educational services if there is an influx of displaced students. Human rights protections for host populations will ensure that host communities benefit from the

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305. *See generally* WORLD BANK, *supra* note 283, at 153–184.

306. *See* U.N. Comm. on Econ., Soc. & Cultural Rights, *General Comment No. 4, The Right to Adequate Housing* (Sixth session, 1991), U.N. Doc. E/1992/23, annex III at 114 (1991), *reprinted in* Compilation of General Comments and General Recommendations Adopted by Human Rights Treaty Bodies, U.N. Doc. HRI/GEN/1/Rev.6 at 18 (2003) (describing the right to housing).

307. U.N. Comm. on Econ., Soc. & Cultural Rights, *General Comment No. 15: The Right to Water*, U.N. Doc. E/C.12/2002/11 (Nov. 29, 2002) (describing the right to water).

308. *See, e.g.*, U.N. Comm. on Econ., Soc. & Cultural Rights, *General Comment 12: Right to Adequate Food*, U.N. Doc. E/C.12/1999/5 (May 12, 1999) (describing the right to food).

309. Inter-Agency Standing Committee, Protecting Persons Affected by Natural Disasters: IASC Operational Guidelines on Human Rights and Natural Disasters, June 2006, 10; IASC B.2.3

relocation and preserve or improve their standard of living, and will also prevent conflicts and competition with the displaced populations.[310]

2.5.1.2 Social-Ecological Indicators for Relocation

Governmental and nongovernmental actors must know when to collectively and collaboratively shift from the traditional, "protect in place" post-disaster recovery response to a community relocation process. The relocation policy framework should thus clearly define standardized socio-ecological indicators of relocation. These indicators need to be specific to ecosystems, geographic regions, and social, political, and economic systems. To determine which communities are most likely to require relocation, a complex assessment of a community's ecosystem vulnerability to climate change, as well as the stability of its social, economic, and political structures, must be considered. Funding must be allocated so that ongoing socio-ecological assessments can evaluate the impact of climate change on community habitability.

For example, in Alaska, the indicators of socio-ecological vulnerability demonstrating that relocation is required should include: 1) repetitive loss of community infrastructure; 2) imminent danger to the community from ongoing ecological changes and repeated random extreme weather events; 3) no ability for community expansion; 4) high numbers of evacuation incidents and numbers of people evacuated; 5) high predicted rates of environmental change (e.g., sea level rise) from IPCC; 6) repeated failure of

310. See also, Global Facility for Disaster Reduction and Recovery, Handbook for Reconstructing After Natural Disasters (2009), http://www.housingreconstruction.org/housing/sites/housingreconstruction.org/files/Chapter%205%20To%20Relocate%20or%20Not%20to%20Relocate.pdf.

hazard mitigation measures; 7) a lack of viable access to transportation, potable water, communication systems, power, and waste disposal; and 8) decline in socio-economic indicators, including food security, loss of livelihood, and public health.[311]

2.5.2 Adaptive Governance Framework

To implement the relocation policy framework, a multi-level and multi-disciplinary adaptive governance framework must be created. Adaptive governance is the term used to describe institutional arrangements that govern natural resources and can respond to rapid ecosystem changes.[312] In the context of climate-induced population displacement, adaptive governance means that institutions have a range of options to respond to the humanitarian needs of communities faced with changing ecological conditions that impact community habitability.

Climigration requires institutions to prepare for a continuum of responses that includes post-disaster recovery, protection in place (consisting of seawall and shoreline protection), hazard mitigation, and relocation. Agencies—such as FEMA, the U.S. Army

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311. These indicators are a compilation of the climate-induced social and ecological threats documented by the five Alaskan coastal communities—Kivalina, Shishmaref, Newtok, Shaktoolik and Unalakleet—facing relocation. See generally IAW 2009 RECOMMENDATIONS, *supra* note 247, and IAW 2008 RECOMMENDATIONS, *supra* note 14, for a description of these threats.

The Immediate Action Workgroup (IAW), part of the Alaska Climate Change Sub-Cabinet, issued two reports in March 2008 and April 2009 documenting the social and ecological threats to six communities facing relocation and recommended actions and policies to prevent loss of life and property in these communities. The IAW used the following criteria to determine that communities are in peril and need to relocate: 1) life/safety risk due to storm/flood event; 2) loss of critical infrastructure; 3) public health threats; and 4) loss of ten percent or more of private residences. IAW 2009 RECOMMENDATIONS, *supra* note 247, at 84; IAW 2008 RECOMMENDATIONS, *supra* note 14, at 1.

312. *See* Carl Folke, Thomas Hahn, Per Olsson & Jon Norberg, *Adaptive Governance of Social-Ecological Systems*, 30 ANN. REV. ENV'T & RESOURCES 441, 444 (2005) (describing adaptive governance as "experiences of governance in relation to complex adaptive ecosystems and in particular during periods when change is abrupt, disorganizing, or turbulent").

Corps of Engineers, and the Alaska Department of Homeland Security and Emergency Management Services—that traditionally "protect in place" and provide post-disaster relief and hazard assessment and mitigation will continue to engage in these activities until relocation must occur to protect the life and well-being of the community. At this point, the community, along with tribal, state, and federal governments, will shift their focus to create a relocation strategic plan.

In order to ensure an effective adaptive governance structure, several changes need to be made to existing law.

2.5.2.1 Amendments to the Hazard Mitigation and Post-Disaster Recovery Statutes

An adaptive governance framework for climate-induced population displacement should include the organizational structure traditionally used to respond to and prevent disasters. This traditional organizational structure is critically important to ensure that relocation only occurs when there are no other durable solutions. However, for this structure to effectively respond to the needs of relocation, the statutes governing the process require the following amendments.

The Stafford Act must be amended so that post-disaster recovery is part of an adaptive governance framework that includes relocation. First, the statutory definition of a "natural catastrophe" needs to expand to include gradual and recurring climate-induced ecological processes. This would allow the President to declare such circumstances a disaster and release federal funds for pre-disaster hazard mitigation.[313] Second, federal

313. *See* 42 U.S.C. § 5122 (providing the current definition for natural catastrophe which

and state statutes need to specifically permit federal disaster relief funding to be used to build new infrastructure at a relocation site and relocate an entire community. These two amendments will allow a community threatened by climate-induced ecological changes to shift seamlessly from a disaster recovery to community relocation.

The Pre-Disaster Mitigation Program and the Hazard Mitigation Grant Program also should be amended so that the hazard mitigation institutional structure can become part of an adaptive governance framework that includes relocation. These amendments should also change the scope, timing, and funding of hazard assessments. The federal, tribal, and state government agencies must have the funding and the authority to conduct ongoing socio-ecological assessments. Currently, the hazard mitigation grant programs provide limited mechanisms to conduct hazard assessments prior to a Presidential disaster declaration.[314] Yet hazard assessments are critical evaluation tools that can monitor gradual and continuous natural processes and also capture unexpected ecological feedback loops that may drastically impact the ability of communities to remain protected in place. In Newtok, decades passed between the assessments of erosion and flooding on the community's habitability. At a minimum, each time a community seeks funding for erosion, flood control, or post-disaster recovery, hazard mitigation assessments should analyze the feasibility of relocation. Hazard assessments need to include measures of hazard impacts on a community's social, economic, and political well-being. The hazard

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does not include gradual ecological change except for drought); Immediate Action Workgroup, Meeting Summary, Jan. 18, 2008, at 3–6, http://www.climatechange.alaska.gov/docs/iaw_18jan08_sum.pdf.

314. *See* 42 U.S.C. § 5133 (2006) (outlining the steps States and local governments need to take to receive technical assistance from the federal government to respond to and prevent hazards).

assessment must evaluate the viability of using traditional methods of protecting communities from natural hazards, such as erosion and flood control. The cost-benefit analysis also needs to include culturally-relevant definitions of costs and benefits.[315] For example, the ability of a community to maintain subsistence practices is a significant benefit to Alaska Native communities that needs to be included in the cost-benefit analysis.[316]

2.5.2.2 Creating a Relocation Institutional Framework

Leadership is a key element of adaptive governance.[317] Leaders are critical to the execution of a dynamic institutional response that shifts from post-disaster relief and hazard mitigation to the relocation of an entire community.[318] Leaders must use the knowledge generated by the socio-ecological assessments to facilitate well-structured dialogue between scientists, community leaders, policymakers, and government representatives.[319] Leaders are also essential to ensure the coordination and collaboration of multi-level and multi-disciplinary governmental and nongovernmental actors.[320] Leaders need to be identified at each level of governance and within disciplines to effectuate this cross-scale coordination and collaboration.

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315. *See* GAO 2009, *supra* note 9, at 37.
316. *Id.*
317. *See* Folke, Hahn, Olsson & Norberg, *supra* note 305, at 451 ("Collaboration in governance networks requires leadership.").
318. *See* Thomas Dietz, Elinor Ostrom & Paul Stern, *The Struggle to Govern the Commons*, 302 SCIENCE 1907, 1909 (2003) ("Success [in adaptive governance] appears to depend on the existence of incentives that benefit leaders in volunteering over laggards and on the simultaneous use of other strategies, particularly ones that create incentives for compliance.").
319. *See id.* at 1908 ("Environmental governance depends on good, trustworthy information about stocks, flows, and processes within the resource systems being governed, as well as about the human-environment interactions affecting those systems.").
320. Folke, Hahn, Olsson & Norberg, *supra* note 305, at 451.

In order to ensure the success of the adaptive governance framework, the relocation institutional framework should create a clear organizational structure to implement the relocation policy framework. Under this new framework, lead federal and state relocation agencies would be responsible for implementing two essential organizational components to address the unique issues that arise each time a community relocates: a process framework for relocation planning and implementation and an operational framework for the actual relocation. State and federal statutes should specifically outline the institutional framework and funding for the relocation process. The relocation institutional framework should designate a lead federal and state relocation agency that provides overall authority to guide multi-disciplinary and multi-level governmental and nongovernmental teams of agencies involved in community-specific relocation plans.

The relocation process framework should identify key stakeholders involved in the community relocation, outline the mechanisms for stakeholder coordination, define the role of the existing community's government in the relocation process, develop a land acquisition process, describe the responsibilities and procedures for making relocation decisions, identify regulatory and permitting requirements, and determine how each will be met and the mechanisms for making modifications to the relocation strategic plan during implementation.[321]

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321. *See* WORLD BANK, *supra* note 283, at 95–144 (describing key considerations for involuntary resettlement planning). The World Bank developed an institutional relocation framework based on its experience of community relocation in development projects. However, the World Bank guidelines are not based on human rights doctrine. As a result, the development-induced relocations have led to the impoverishment and social fragmentation of the communities forced to relocate. *See generally* Anthony Oliver Smith, *Introduction* to DEVELOPMENT & DISPOSSESSION 3 (Anthony Oliver Smith ed., 2009) (describing the enormous trauma and hardship experienced by those displaced by development projects).

2.5.2.3 Role of Existing Local Governance Institutions

Planning challenges can arise because of the lack of clear statutory guidance about the role of local government in the relocation process. First, the existing community's government may have no authority to make decisions at the relocation site. Second, it may be necessary to define and structure the relationship between the owner of the relocation site and the future government of the new community.[322] Without clearly defining the governance authority at the relocation site, decision-making at the local level may delay the relocation process—or, in the most extreme cases, make it impossible for the local government to have any authority to make decisions connected with the relocation site. Similarly, when a village selects a relocation site that it owns, but access to the site requires transiting through property owned by other entities, there must be a process to define the relationship and a governing authority responsible for negotiating transit rights.

In order to resolve these issues, the existing community's government must have the authority to be a key leader and decision-maker in the relocation process. The community-specific relocation process framework needs to identify the steps that a local government must take to continue in its governance role during the relocation process. The authority to govern may be based on the connection to a defined population or to a defined territory. Clear statutory guidance needs to outline the mechanism that the governing authority of the existing community will use to continue in its governance role over the relocation site.

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322. *See generally* Van Tuyen, *supra* note 236 (outlining the legal issues that can arise when land title is not clearly defined in a relocation process).

2.5.2.4 Operational Relocation Framework

The operational relocation framework should outline the comprehensive strategic relocation plan, identify the staffing patterns required for relocation, develop a capacity-building plan for the relocation staff (if necessary), develop coordination arrangements among relevant agencies, monitor the health and well-being of community residents during the relocation process, design and implement the process for gathering and disseminating information, and create an overall timeframe for completing the relocation and decommissioning the old village site.

2.5.2.4.1 Capacity Building for Relocation Staff

Relocation places enormous burdens on governance structures. State and local governments are typically structured and staffed to deal with the business of governing established and existing communities. Relocating entire communities involves a lot more work than overseeing an existing community. Without an operational relocation framework that can address relocation staffing issues, local government institutions are expected to deal with relocation. However, this can often strain the limited resources of local governments.[323] Funding needs to be designated to hire and train staff at all levels of government involved in the relocation process.

323. *See* IAW 2009 RECOMMENDATIONS, *supra* note 247, at 67 (discussing the lack of staff available locally to deal with the intricate requirements associated with receiving government funding).

2.5.2.4.2 Comprehensive Strategic Relocation Plan

Comprehensive strategic relocation plans are essential to the relocation of an entire community. The multi-year relocation effort of the Newtok Planning Group highlights the need to include several components in a strategic relocation plan, including: 1) resolving land issues; 2) decommissioning the old village site; 3) physically relocating the existing infrastructure, if feasible; 4) designing the community layout at the relocation site; 5) building critical infrastructure at the relocation site; 6) physically relocating residents to the community relocation site; 7) assessing the socio-economic needs of community residents during and after the relocation process; and 8) assessing the need for historical and cultural preservation.

2.5.2.4.2.1 Land Issues

Relocation of an entire village to a new location creates complex and unique public and private property rights issues that need to be addressed in the relocation planning process. Local governments will need to determine land tenure issues, such as whether property will be common, public, or privately held, and land title allocation between prospective community residents, businesses, and government entities. In addition, the relocation institutional framework needs to create geographically-relevant standardized criteria to evaluate the habitability and feasibility of the relocation site. These criteria should include the following: 1) current land use, including for subsistence; 2) restrictions associated with the land, such as environmental protections; and 3) habitability of the land, including accessibility of the land, availability of water, climate

change vulnerabilities (e.g. vulnerability to storm surges or thaw of ice-rich permafrost), and feasibility of subsistence/agricultural use. Specifically defining these criteria is essential so that the community being relocated and the government agencies providing technical assistance are in agreement in regard to the habitability of the relocation site. Any disagreement over the relocation site will only serve to delay and impede relocation efforts.[324]

The relocation of communities also requires many types of government approvals and permits due to the potential construction of multiple major facilities, including airports, barge landings, schools, health clinics, and housing.[325] No one government agency is responsible for the construction of all of these facilities. The process framework needs to identify the permitting requirements for relocation and develop a plan to fulfill these legal obligations. In addition, community usage of the old site, which may provide critical access to subsistence resources or historical sites, needs to be clarified.

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324. Shishmaref and Kivalina are two Alaskan indigenous communities that are also in the process of relocation because of climate-induced threats. Both communities have chosen relocation sites that do not meet government standards regarding habitability. As a consequence, the relocation efforts of both communities have been significantly delayed. *See supra* note 106.

325. Permits required by the National Environmental Protection Act include, but are not limited to, estate permits and fish habitat permits. IAW 2009 RECOMMENDATIONS, *supra* note 247, at 66. *See also supra* note 106.

2.5.2.4.2.2 The Decommission of the Old Village Site

Cleaning up and securing old village sites so that they can be responsibly abandoned presents significant planning challenges.[326] In order to transition from the old village sites, environmental assessments must be conducted to analyze: 1) the hazardous wastes and clean-up required;[327] 2) infrastructure that can not be moved to the relocation site and a removal plan; and 3) the natural environment and the steps that must be taken to renew it to a natural ecosystem type compatible with the current or projected environment.

2.5.2.4.2.3 Identification of Infrastructure

Village sites contain a variety of public, private, and community-owned structures, each of which has its own set of circumstances that must be evaluated, planned for, and dismantled or secured. Relocation plans need to identify each of these structures and decide which entities will be replaced at the relocation site, which will be rehabilitated at the original community location, and which have special religious, historical, or spiritual significance that requires special procedures.[328] The relocation plan also needs to identify

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326. *See generally* Van Tuyen, *supra* note 236.

327. Hazardous waste clean-up is a critical component of the relocation process. Climate-induced ecological changes may create unique challenges to securing hazards. In Alaska, thawing permafrost and erosion are creating unstable ground that will prevent the traditional methods of abandonment, such as capping a landfill, from protecting the environment. Fuel tank farms and sewage facilities may collapse into the rivers or lakes as more erosion occurs. In addition, exposure to contaminants that were previously frozen and buried are a concern with erosion and melting permafrost because of the possibility that they can enter the soil and water sources. Determining the appropriate method to secure these facilities will require planning, money, and expert technical assistance.

328. In the United States, the National Historic Preservation Act requires federal and state agencies to assess the impact of projects on historic properties and seek ways to avoid, minimize, or mitigate any adverse effects on these properties. 36 C.F.R. § 800.1(a) (2009). The Alaska Historic Preservation Act contains a similar provision, which mandates that any project with state involvement be reviewed in a similar manner. ALASKA STAT. § 41.35.070 (2008). Community-specific relocation plans thus need to outline a process for communities to identify the structures

which agency will be responsible for replacing or rehabilitating the infrastructure and ascertain this cost.

2.5.2.4.2.4 Natural Environment Rehabilitation

The relocation process also must identify the steps to rehabilitate the natural environment of the old village site. Infrastructure and human habitation can alter natural ecosystems, impacting water, soil, vegetation, and other ecosystem components. The comprehensive relocation strategic plan should incorporate the work needed to return the village site to its pre-human habitation condition, if possible.

2.5.2.4.2.5 Construction of Community Infrastructure at the Relocation Site

The construction of public infrastructure at the relocation site is a fundamental component of the relocation process. Current policies discourage federal and state agencies from building some of this infrastructure at a relocation site when there are no inhabitants.[329] These limitations create a difficult situation, as residents will not want to move to the relocation site if the site does not yet have the facilities to support a population. For example, the Alaska DOT requires the existence of a school in the community before their Project Evaluation Board will evaluate a proposed project.[330] Yet statutes that govern the construction of schools require a minimum of twenty-five

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that have religious or historic significance and then determine what to do with these structures.

329. IAW 2009 RECOMMENDATIONS, *supra* note 247, at 69.

330. *Id.*

students.[331] Without the enactment of statutes to create a relocation institutional framework, the ability to construct these facilities at an uninhabited relocation site in Alaska is unresolved. Statutes need to be enacted which authorize the construction of facilities at relocation sites irrespective of population.

2.5.2.4.2.6 Health and Well-Being of Community Residents

Relocation places enormous stress on community residents.[332] Baseline data that documents the health and socio-economic status of community residents is critical to the relocation process.[333] Using such baseline data, governments can monitor the health and well-being of community residents. In addition, the relocation process can incorporate special provisions to ensure that the needs of all residents, including the elderly, children, and those with medical conditions, are addressed.

2.5.3 Conclusion

A relocation process and operational framework are key components to the design and implementation of a relocation adaptive governance framework. The creation of new mechanisms for multi-disciplinary and cross-scale coordination is essential to the planning, design, and implementation of village relocations. These new mechanisms must

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331. *See* ALASKA STAT. §§ 14.17.400, 410, 500 (2008); IAW 2009 RECOMMENDATIONS, *supra* note 247, at 69.

332. *See e.g.*, BACKGROUND REPORT, *supra* note 132, at 12; Smith, *supra* note 314 at 3–23 (discussing the legacy of poverty, misery, and intergenerational trauma caused by development-forced displacement).

333. WORLD BANK, *supra* note 283.

be community-led, dynamic, and able to respond to a rapidly changing environment that threatens the habitability of the community.

2.6 Conclusion

The extreme weather events of 2010 are evidence that climate change is profoundly impacting the habitability of communities around the world. In Alaska in particular, climate-induced ecological changes caused by a combination of gradual ecological processes and extreme weather events are repeatedly damaging community infrastructure, threatening the lives and well-being of community residents and permanently altering the habitability of indigenous communities. In many cases, community relocation is the only permanent solution. Yet post-disaster recovery and hazard mitigation laws, designed to respond to temporary displacement, are unable to effectively respond to the need for climigration. Moreover, the policy and practical challenges to community relocation are enormous.

While Newtok is currently the only Alaskan community engaged in a relocation process, the federal government has documented that an additional eleven communities need to relocate to avert a larger humanitarian crisis. With no federal or state statutory mandate, it is uncertain whether other threatened villages could replicate the Newtok Planning Group to facilitate their own relocation. The United States should lead the effort to respond to climate-induced community relocations and implement legislation to provide governance tools and resources so that communities forced to relocate due to

rapid and radical climate change can be resilient. In this way, the United States can create a model adaptation strategy that facilitates an effective transition from protection in place to community relocation that governments throughout the world faced with climigration can implement.

CHAPTER 3

ADAPTIVE GOVERNANCE AND INSTITUTIONAL STRATEGIES FOR CLIMATE-INDUCED VILLAGE RELOCATIONS IN ALASKA[A]

3.1 ABSTRACT

This article presents governance strategies to facilitate community-based adaptation to climate change. In Alaska, climate change-induced coastal erosion is impacting the habitability of entire communities. Community residents and government agencies concur that relocation is the only adaptation strategy that can protect community lives and infrastructure. Community relocation is stretching the financial and institutional capacity of existing governance institutions designed to protect lives from natural disasters. Based on a comparative analysis of three communities that have chosen to relocate, we examine the institutional constraints to relocation in the United States and identify components of a toolkit and policy changes that can facilitate community-based adaptation strategies to foster community resilience and protect the human rights of community residents. Leadership at the local level and integration of social and ecological well-being into adaptation planning are key components of the toolkit.

[A] Bronen, R. and Chapin III, F.S., 2012. Adaptive Governance and Institutional Strategies for Climate-Induced Relocations in Alaska. Proceedings of the National Academy of Sciences, submitted June 21, 2012, accepted pending revision. Ms. Bronen conceptualized and conducted the research and she and Dr. Chapin jointly interpreted the results in the context of arctic climate change.

Keywords: adaptive governance, Alaska, climate change, climigration, community relocation

3.2 Introduction

Human displacement could be a severe humanitarian consequence of climate change (IPCC, 2007). Natural disasters have increased substantially over the past century, with approximately 370 natural disasters (more than one per day) displacing 38 million people in 2010 (CRED, 2010; Norwegian Refugee Council, 2011). Floods caused 182 of these disasters, affecting 180 million people and killing 8,100 (CRED, 2010). Sea level rise, floods, droughts and hurricanes may permanently displace hundreds of millions of people by 2050 (Stern, 2007). Climigration is a specific type of permanent population displacement that occurs when community relocation is required to protect residents from climate-induced biophysical changes that alter ecosystems, damage or destroy public infrastructure, and repeatedly endanger human lives (Bronen, 2010). Climigration occurs when climate-induced changes prevent people from returning home.

The complex interplay of repeated extreme weather events and on-going biophysical processes, such as erosion and climate-induced sea-level rise, endanger the lives of inhabitants in many coastal communities, particularly in low-lying island nations (Woodworth, 2005), subsiding river deltas (Ericson et al., 2006), and zones of active coastal erosion (Jones et al., 2009; Mars and Houseknecht, 2007). Approximately 10% of the world's population resides in coastal communities that are 10 meters or less above current sea level (Buddemeier et al., 2004; Nicholls and Cazenave, 2010), and the

population within the 1000-year zone of coastal flooding is projected to increase from 200 million in 1990 to 300-560 million in 2080 (Nicholls et al., 2007). Community relocation, in which livelihoods, housing, and public infrastructure are reconstructed in a location, away from vulnerable risk-prone coastal and riverine areas, provides the possibility of managed adaptive retreat. This may be the only viable adaptation strategy for communities whose current location is uninhabitable, or the relocation reduces vulnerability to future climate-induced ecological threats.

Disaster relief and hazard mitigation, which primarily funds flood- and erosion-protection measures and repair and rebuild activities post-disaster, are the traditional humanitarian responses to extreme environmental events (GAO, 2009). Voluntary property acquisition is one of the hazard-mitigation programs that authorizes the relocation of individual structures within flood plains. However, this program does not provide a governance framework for communities seeking to relocate the entire public and private infrastructure within their community to a new location in order to reduce vulnerability and protect them from these events. Consequently, no institutional framework exists within the United States to guide community relocations, and no federal or state government agency has the authority to relocate communities (GAO, 2009). Furthermore, determining which communities are most likely to encounter displacement requires a sophisticated assessment of a community's social, political and economic susceptibility to harm caused by climate change and its capacity to adapt through protection in place, managed retreat of some structures or community-wide relocation. This assessment is critical to determine whether erosion- and flood-control measures can

protect community residents and infrastructure as climate-change impacts accelerate. There is currently no legislation authorizing funding for such assessments.

In this paper we first discuss the suitability of the current post-disaster and hazard-mitigation statutory framework to address climigration in the U.S. We then examine the institutional challenges faced by Alaskan villages seeking to relocate in response to climate change. We conclude by describing an adaptive-governance strategy that can provide a continuum of responses from protection in place to community relocation and would allow more effective and less costly adaptation to climate change. Finally, we suggest some simple policy changes to implement this strategy.

3.3 Methods

To understand the community relocations occurring in Alaska, we conducted a case study of the relocation process in Kivalina, Shishmaref and Newtok. Data-gathering tools used to collect evidence, included surveys, interviews, participatory observation, the gathering and study of organizational documents of the Newtok Planning Group, the Shishmaref Erosion and Relocation Coalition and the Immediate Action Workgroup, including agendas, letters, e-mails, minutes, and news clippings about the relocation efforts of Newtok, Kivalina and Shishmaref. Archival document review included review of the following: erosion assessments conducted by the US Army Corps of Engineers; results of the Newtok Housing Survey; community relocation lay-out documents and geotechnical documents for each community; community relocation reports; and, federal government relocation, erosion and climate-change reports.

RB and FSC participated in approximately 45 and 10 meetings, respectively, occurring on three different governance levels since 2007. These included meetings conducted by the Newtok Planning Group, the Immediate Action Workgroup and the Adaptation Advisory Group created by the Subcabinet on Climate Change to respond to the immediate needs of communities threatened by climate change, the Native Village of Newtok, and the Native Village of Kivalina. RB and FSC also visited Newtok eleven and three times, respectively, since 2007 to facilitate a housing survey, attend community relocation meetings, and visit the relocation site. RB also visited Kivalina once to attend a community relocation meeting and conducted unstructured interviews with key members of the Newtok Planning Group and the Immediate Action Workgroup, which included these questions: what should the role be of state and federal government to relocate a community and what should be the indicators to determine whether community relocation is warranted?

3.4 Results

3.4.1 Policy Analysis: Post-Disaster and Hazard-Mitigation Statutory Framework

Significant statutory limitations prevent the government from responding effectively to the gradual biophysical changes that force communities to relocate in Alaska. The Federal Emergency Management Agency (FEMA), whose activities are defined by the 1988 Stafford Disaster Relief and Emergency Assistance Act, is the federal agency responsible for hazard mitigation and disaster relief in the U.S. (GAO, 2009; Moss and Shelhamer, 2007). The act requires a presidential disaster declaration to access federal funding for post-disaster recovery as well as most hazard-mitigation

activities (Moss and Shelhamer, 2007). Generally, the Governor of an affected state must request this presidential disaster declaration. Under the Stafford Act, the President is authorized to declare a disaster for natural catastrophes such as hurricanes and tornados. Drought is the only gradual ecological process listed in the statute as a potential catalyst for a presidential disaster declaration (Moss and Shelhamer, 2007). Erosion, which is one of the significant hazards faced by Alaskan coastal communities, is not included in the list of major disasters in the Stafford Act (Moss and Shelhamer, 2007). Federal resources for post-disaster recovery are primarily designed to help rebuild individual homes in their current location (GAO, 2009; Moss and Shelhamer, 2007).

The Disaster Mitigation Act of 2000 modified the Stafford Act by establishing a federal program for pre-disaster mitigation. Five FEMA grant programs comprise the pre-disaster-mitigation federal response, none of which provide for community-wide relocation (GAO, 2009). One of the federal hazard-mitigation grant programs, the Hazard Mitigation Grant Program (HMGP), provides funds to develop a Hazard Mitigation Plan for areas that have been declared a federal disaster (GAO, 2009). Mitigation planning requires a comprehensive risk assessment, consisting of three components: hazard identification, vulnerability assessment, and risk analysis (May and Plummer, 2011). This risk assessment requirement helps a community identify and prioritize mitigation activities to prevent or reduce losses from the identified hazards. Although the regulations require that approved mitigation plans be reviewed at least every five years, the integration of this information into risk analyses to inform mitigation activities is costly (May and Plummer, 2011). Funding for mitigation activities is allocated nationally

on a competitive basis based on cost-benefit ratios (GAO, 2009). Voluntary property acquisition is one of the tools of the Hazard Mitigation Grant Program to permanently remove structures from floodplains after a disaster has occurred. Homes are individually purchased and demolished or relocated to another location outside of the floodplain. In the context of this program, relocation means moving a structure to another lot, or reestablishing an entire neighborhood at a new site within the community. The program requires that the land in the floodplain be designated as open space for recreational or agricultural purposes in perpetuity after the structures are removed (44 CFR 206.434(d)). The community of Tulsa, Oklahoma has used this program to relocate thousands of structures outside of floodplains and create open spaces (Patton, 2009).

Alaskan communities have difficulty competing for hazard mitigation funds, including the property acquisition program, due to their remote location and low population, which equates to high costs and low benefits (GAO, 2009). In addition, erosion is the primary cause for relocation and erosion is not included in the list of environmental events, as defined by law, that can initiate a presidential disaster declaration (Bronen, 2011). Disaster-relief and hazard-mitigation measures are important when protection in place is possible, but are insufficient to respond to the climate-induced biophysical changes in Alaskan communities.

To respond to this gap, the Alaska State Legislature created the Alaska Climate Change Impact Mitigation Program (ACCIMP) in 2009 to supplement the federal Hazard Mitigation Grant Program (3 AAC 195.040). The ACCIMP provides funds for hazard impact assessments to evaluate climate change-related impacts, including gradual

ecological change, such as erosion. The remaining funds are allocated for the planning needs and adaptation strategies to reduce vulnerability to the hazards identified in these assessments. Relocation planning activities can be funded.

Funding from the ACCIMP is limited to two community categories. Non-competitive funding is allocated to six communities designated by name that are currently threatened by climate-induced biophysical change. The remaining funds are administered through a competitive grant process to communities based on an evaluation of four factors: (1) risk to life or safety during storm or flood events; (2) loss of critical infrastructure; (3) threats to public health; and (4) loss of 10 percent or more of residential dwellings. Communities that receive this funding to complete hazard-impact assessments will then be eligible for additional funding to support adaptation activities, including relocation planning.

The ACCIMP is a government-bridging program that provides a mechanism for communities to assess climate risks and create adaptation strategies, including relocation. However, this regulation does not mandate or authorize any state agency to provide relocation technical assistance if relocation is determined to be the most feasible adaptation option that will protect lives and property. As a consequence, no institutional relocation governance framework exists to implement community relocation in Alaska.

3.4.2 Community Relocation Efforts in Alaska

Community relocation in Alaska is already a recognized need. In the past, arctic sea ice protected indigenous coastal communities along the Bering and Chukchi Sea from coastal erosion and flooding by creating a barrier to storm-related waves and surges.

Regional warming has thawed coastal permafrost due to warmer air and water temperatures (Jones et al., 2009; Ravens et al., 2012) and has reduced summer sea ice cover by 39-43% since 1979 (Meier et al., 2007; Stroeve et al., 2012), leading to a longer fetch and taller waves (Francis et al., 2011). Together, these changes have increased rates of coastal erosion, especially during severe autumn storms, which (due to the longer ice-free season) are now more likely to occur during ice-free conditions (Jones et al., 2009; Mars and Houseknecht, 2007; Overeem et al., 2011). The Division of Homeland Security and Emergency Management documented 119 disaster declarations in Alaska since 1978, resulting from 228 flooding events (GAO, 2009). Approximately 40% of these flood disasters occurred from 2000 to 2008 (GAO, 2009).

In 2003, the U.S. General Accounting Office (GAO) found that four Alaskan communities were seeking to relocate, and erosion affected 184 communities (GAO, 2003). Six years later, in 2009, the number of communities seeking to relocate had tripled, and none of the four communities identified in the 2003 report had relocated (GAO, 2009). Before 2006, local, state, and federal government agencies responded within the context of disaster relief, spending over $10 million to provide temporary erosion control to the three communities (Kivalina, Shishmaref, and Newtok) that the U.S. Army Corps of Engineers (USACE) concluded must be relocated within 10-15 years (USACE, 2006a; USACE, 2008b). However, few policies and protocols exist to provide relocation assistance, and no agency has the authority to assist them. Instead, community residents must bring together multiple agencies with different authorities, procedures, and responsibilities.

In this section, we describe the relocation process of the three communities identified in the 2003 U.S. GAO report as most critical to relocate. The governments of Kivalina, Shishmaref, and Newtok (Fig. 1) recognized decades ago that community relocation was the only solution to protect their respective communities from life-threatening biophysical change. Each community has undertaken a three-pronged relocation process that involved 1) identification of a new village site, 2) resident voter approval of the relocation site, and 3) documentation to substantiate the need to relocate and the suitability of the relocation site for the community (ASCG, 2004; Gray, 2010; USACE, 2006b). Each community also commissioned several social-ecological assessments and relocation evaluations. Despite the similarity of the steps taken by each community to relocate, only Newtok has begun the relocation process. A comparison of the three case studies demonstrates a common suite of challenges faced by Alaskan communities seeking to relocate and some of the factors that have either contributed to or constrained progress toward relocation.

The ancestors of the current residents of Kivalina, Shishmaref, and Newtok moved seasonally among coastal and inland hunting and fishing camps (Marino, 2012; ANTHC, 2011; Berardi, 1999; Schweitzer et al., 2005; USACE, 2008b). This migratory lifestyle changed during the late nineteenth and early twentieth century primarily because the U.S. Department of the Interior's Bureau of Education began to develop a formal educational system for the Alaska Native community (Berardi, 1999; Darnell, 1979). The construction of schools along the western coast of Alaska, and the requirement that Alaska Native children attend school caused the Alaska Native population to consolidate

and settle (Berardi, 1999; USACE, 2008b). Barge accessibility to transport construction materials determined the location of the schools (USACE, 2008b). The building of permanent schools and housing and of sewage, water, and electricity infrastructure led to a change from seasonal migration to establishment of permanent communities at the school sites selected by the federal government (Marino, 2012). This reduced the flexibility of each community and created a new set of dependencies on government to respond effectively to environmental changes.

3.4.2.1 Kivalina

The Village of Kivalina is an Inupiaq Eskimo federally recognized indigenous tribe located on the tip of a thin, six-mile-long barrier reef island in the Chukchi Sea, 128 kilometers above the Arctic Circle (USACE, 2006b) (Fig. 2). Storm surges and flooding threaten the community as a result of diminished arctic sea ice and the delay in freezing of the ocean. Between 2002 and 2007, six extreme weather events threatened Kivalina. The state and federal government issued three disaster declarations (Gray, 2010). The most recent extreme event was a hurricane-strength storm in November 2011 (Israel, 2011). Between 2006 and 2009, government agencies spent $15.5 million on these erosion control projects (Gray, 2010). These erosion control measures have not been able to protect them (IAWG, 2008c).

Erosion caused by storm surges impacts infrastructure that is essential for the viability of the community in its current location until such time as relocation can occur. These include the only means of access to the community (the summer barge landing and

the community's airstrip), the community's sole water source, and the stability of the community's solid waste storage containment area (ANTHC, 2011; USACE, 2006b).

The failure of government agencies to outline geophysical criteria for a relocation site has exacerbated an extremely slow relocation process. In 1998 and 2000, the community voted to relocate and chose two different relocation sites, which the USACE later determined after each vote were unsuitable because of thawing permafrost (Gray, 2010). In January 2012, Kivalina community residents voted to construct a new school 7 miles from their current location. Funding for the new school is coming from a lawsuit settlement agreement involving funding inequities that harmed rural Alaskan schools (D'Oro, 2011). The Alaska Department of Transportation and Public Facilities (DOT) and US Army Corps of Engineers are working together to construct a road between the current community location and the school site. The road will provide an evacuation route during an extreme weather event, and the school may serve as pioneer infrastructure for community relocation. However, due to the different budget and funding criteria for each agency, it is unclear when the road will be built. Identification of a relocation site is a critical step to moving the community's relocation efforts forward but there is no clear road map for how the community will move all of its residents, infrastructure and housing to this location.

3.4.2.2 Shishmaref

Shishmaref is an Inupiat Eskimo community located on Sarichef Island on the northwest coast of Alaska. Between 1973 and 2009, the state, federal, and tribal governments invested about $16 million in shoreline protection to address the accelerating rates of erosion (GAO, 2009; SERC, 2002). Despite this investment, storms have repeatedly damaged or destroyed public infrastructure as well as the homes of community residents (Fig. 3).

In 2001, the Native Village of Shishmaref created the Shishmaref Erosion and Relocation Coalition (SERC) (GAO, 2009). This Coalition has worked with multiple federal agencies and their contractors to identify a new, safe, and culturally appropriate community location.

In 2002, residents voted to relocate the community, and two federal government agencies began studying the relocation issue—the USACE, mandated to providing engineering services to reduce risks from disasters, including flood control, and the U.S. Department of Agriculture Natural Resources Conservation Services, mandated to help people reduce soil erosion and damages caused by floods and other natural disasters (GAO, 2009). Although neither agency had guidelines or a mandate regarding analysis of relocation site suitability, both agencies conducted a series of studies regarding alternative relocation site selection for the community of Shishmaref.

In 2004 SERC chose Tin Creek as the community's preferred relocation site. Between 2004 and 2008, NRCS, USACE and Alaska DOT conducted approximately six separate studies to evaluate the suitability of the relocation site (BEESC, 2010). DOT

determined that the community's preferred site at Tin Creek is unsuitable due to the presence of ice-rich permafrost that could thaw due to climate warming and create future problems for community habitability (BEESC, 2010). As a consequence, the most recent relocation site analysis, conducted in 2010, recommended a relocation site 10 miles from the community, which may meet the community's need to be close to their traditional subsistence grounds and also meet government geophysical requirements (BEESC, 2010). After geophysical tests are conducted to determine the site's suitability, the community will vote again to determine if this site also meets their needs (BEESC, 2010). As in Kivalina, government agencies and the majority of community residents agree that relocation is the only adaptation strategy that will ensure the long-term resilience of the community, but there is no clear road map of when or how relocation will occur.

3.4.2.3 Newtok

Newtok, a Yup'ik Eskimo village, is located along the Ninglick River near the Bering Sea in western Alaska (Cox, 2007). A combination of increased temperatures, thawing permafrost, wave action, and river current has accelerated the erosion, causing the Ninglick River to move closer to the village (Cox, 2007) (Fig. 4). Between 1954 and 2003, approximately three-quarters of a mile of tundra eroded in front of the village (Cox, 2007). The State of Alaska spent about $1.5 million to control the erosion between 1983 and 1989 (USACE, 2008b). Despite these efforts, erosion of the Ninglick River is

projected to reach the school, the largest structure in the community, by about 2017 (USACE, 2008a) (Fig. 5).

Six extreme weather events between 1989 and 2006 exacerbated these gradual ecological changes. Five of these events precipitated FEMA disaster declarations (ASCG, 2008). FEMA declared three disasters between October 2004 and May 2006 alone (ASCG, 2008). These three storms accelerated the erosion and repeatedly "flooded the village water supply, caused raw sewage to be spread throughout the community, displaced residents from homes, destroyed subsistence food storage, and shut down essential utilities" (USACE, 2008a). Public infrastructure that was significantly damaged or destroyed included the village landfill, barge ramp, sewage treatment facility, and fuel storage facilities (USACE, 2008b). The only access to the community is by barge during the summer or by airplane. The barge landing, which allows for most delivery of supplies and heating fuel, no longer exists, creating a fuel crisis. Salt water is affecting the potable water (Cox, 2007).

Newtok inhabitants voted three times, most recently in August 2003, to relocate to Nelson Island, nine miles from Newtok (Cox, 2007). Newtok obtained title to their preferred relocation site, which they named Mertarvik, through a land-exchange agreement negotiated with the U.S. Fish and Wildlife Service in 2003. No infrastructure existed at the relocation site. In 2006, the Newtok Traditional Council received funding to build three houses at Mertarvik. With no assistance from state or federal government agencies, Newtok community residents built this first infrastructure. In 2009, construction of pioneer infrastructure, including a multi-purpose evacuation center and

barge landing, began at the relocation site because of the work of the Newtok Planning Group.

3.4.2.3.1 Newtok Planning Group

The Newtok Planning Group is an informal boundary organization that emerged in May 2006 from an ad hoc series of meetings after state and federal agencies realized that Newtok was serious about their relocation because of the construction of the three homes in Mertarvik (Bronen, 2011; GAO, 2009). No similar planning group was implemented to respond to the relocation efforts Kivalina and Shishmaref.

The Newtok Planning Group is unique in Alaska in its multi-disciplinary and multi-jurisdictional structure. It consists of about twenty-five state, federal, and tribal governmental and nongovernmental agencies that all voluntarily collaborate to facilitate Newtok's relocation. The Alaska Department of Commerce, Community, and Economic Development (DCCED) is the lead coordinating Alaska state agency for the Newtok Planning Group, but there is no federal agency with the authority to coordinate federal efforts for Newtok's relocation (Bronen, 2011; GAO, 2009). From the Newtok Planning Group's inception, the Newtok Traditional Council has led the relocation effort.

Newtok's relocation presents acute challenges to traditional governance institutions designed to respond to extreme environmental events. However, no state or federal statutes or regulations govern or guide the Planning Group's work. Instead, the Newtok Planning Group has been engaged in an ad hoc process guided by their collective

desire to provide technical assistance to the Newtok Traditional Council. While the Newtok Planning Group has made significant progress toward Newtok's relocation, the policy and practical challenges of designing, funding, and implementing a relocation effort in the absence of statutory guidance or authority have been enormous (IAWG, 2009).

Due to the multidisciplinary nature of the working group, agency representatives have had to educate each other about the laws that govern their work and the funding options and limitations available to each agency (IAWG, 2008a). Moreover, every aspect of the relocation requires state and federal agencies to identify and secure funding in phases and to coordinate their funding efforts, including sharing equipment costs and coordinating its usage. The Newtok Planning Group has been extremely creative in their use of existing revenue sources, employing funds generally available for community projects throughout Alaska to put the relocation puzzle together. State funding to build community public infrastructure, such as schools and air landing strips, is extremely competitive. With no population residing at the relocation site, Newtok has not yet been able to secure these funds to build this critical infrastructure.

Planning efforts have focused on the design and construction of an evacuation center, barge landing, and an access road that connects the two structures and serves the dual purpose of emergency evacuation facilities and also the pioneer permanent infrastructure for the relocation effort. Seven different federal, state and tribal entities are involved with the construction and funding of these facilities, but no agency is authorized

with overall supervision of the project, which has caused delays (Bronen, 2011). Construction of the evacuation center was not yet complete as of 2012.

Meeting the requirements of the National Environmental Protection Act (hereinafter NEPA), which requires environmental impact assessments, has been one of the most significant challenges to Newtok's relocation and has delayed its inception and progress (Bronen, 2011). The designation of a federal lead agency is critical to the fulfillment of NEPA requirements (GAO, 2009). Funding is specifically provided for these assessments, which must evaluate the environmental effects of proposed construction projects undertaken with federal money (42 U.S.C. §§ 4321-4370f (1969)).

Without a lead agency dedicated to Newtok's relocation, no agency has the authority to comply with NEPA's legal obligations for funding, planning, designing, or constructing all of the components of the village relocation (GAO, 2009). The federal agencies have also struggled with the scope of the impact assessment because there is no precedent for NEPA's application to the relocation of an entire community. These statutory impediments to Newtok's relocation will affect all Alaskan communities seeking to relocate.

In summary, although Newtok has worked for approximately a generation (17 years) to relocate, with substantial supporting efforts from numerous government agencies and other entities, statutory and institutional barriers have caused significant delays of the relocation process. In addition, there are no mandates to ensure that the substantial intergovernmental collaboration that has occurred in designing Newtok's

relocation will assist with the relocation of Kivalina, Shishmaref, or other Alaskan communities.

3.5 Discussion

3.5.1 Governance Limitations to Community Relocation in Alaska

In Alaska, the lack of an overarching institutional relocation framework has caused the relocation of Kivalina, Shishmaref and Newtok to proceed in an ad hoc manner. With no clear relocation protocol, Alaskan communities have had no guidance regarding the steps a community must take to engage federal and state entities in a relocation planning process, including which agency has the appropriate authority to initiate or coordinate a relocation planning process. Newtok began a relocation planning process with the Alaska DCCED, whereas Kivalina and Shishmaref worked primarily with federal government agencies, including the USACE. Similarly, at the local level, there is no clear guidance regarding which governing authority can initiate relocation planning activities. Newtok has only one governing body, the Newtok Traditional Council. Both Shishmaref and Kivalina have two local governing bodies, the city government, which is a political subdivision of the State of Alaska, and the tribal council, which has a government-to-government relationship with the federal government of the U.S. (GAO, 2009).

In addition, the relocation site chosen by each community has played an instrumental role in determining whether state and federal government agencies will assist with the relocation effort. The Immediate Action Workgroup recommended,

'[government needs to [c]reate a process/recipe to identify suitable relocation sites to ensure an efficient and successful outcome. Kivalina's experience is a reflection of the downsides of not having an effective process in place' (IAWG, 2008c). Newtok chose a relocation site that was not subject to permafrost thaw and had a good water source. Both Kivalina and Shishmaref chose relocation sites that were later opposed by federal and state government entities due to concerns with thawing permafrost. Kivalina eventually found a relocation site that is culturally appropriate and meets government criteria for site suitability and is slowly moving forward to relocate. The consulting firm hired by the Shishmaref Erosion and Relocation Coalition recommended evaluation of a relocation site not considered by the community of Shishmaref, located 10 miles from the community's current location. The firm suggested that additional geotechnical studies be performed to ensure the site's suitability for relocation. However, with no standardized and clear guidelines establishing criteria for suitable relocation sites or funding for geotechnical evaluation, communities needing to relocate are caught in a maze of conflicting government policies. As a consequence, the relocation efforts in Kivalina and Shishmaref have been delayed and caused a lack of trust and frustration with state and federal government authorities (Marino, 2012; IAWG, 2008c).

Finally, the decision to relocate and the agreement by state and federal agencies that relocation is essential has put each community in an untenable position. Seriously deteriorated infrastructure cannot be upgraded in the current villages because they have no locations within their community safe from flooding (GAO, 2009). The statutory restrictions of the National Flood Insurance Program prevent government agencies from

using funds to repair existing infrastructure due to their location in flood-prone areas (ASCG, 2008; IAWG, 2008b). For example, the design of a solid waste master plan in Newtok, Shishmaref, and Kivalina has been deferred because of each community's decision to relocate and the government's reluctance to build new infrastructure in an existing floodplain (ANTHC, 2011; GAO, 2009; USACE, 2008b). As a result, "honey buckets," five-gallon buckets with plastic bag liners are used in most homes instead of plumbing and sewage disposal (ANTHC, 2011; USACE, 2008b).

3.5.2 Strategies to Address Climate-Induced Community Relocation

Climate-induced population displacement requires a governance framework that can dynamically respond to communities faced with accelerating biophysical changes caused by increased temperatures. Adaptive governance means that institutions have a range of options, which includes post-disaster recovery, protection in place (seawall/shoreline protection), hazard mitigation and relocation, to respond to the humanitarian needs of communities.

Here we summarize a set of general strategy elements that emerge from relocation efforts by Alaskan communities and from other climate-change adaptation efforts (Table 1). None of these strategy elements is essential or by itself guarantees success, but together they provide a toolkit for potentially successful adaptation to climate change. The toolkit is designed to create a multi-disciplinary and multi-level assessment of climate-related risks that fosters leadership and integrates multiple-loop learning to develop adaptation strategies (Armitage et al., 2007; Lavell et al., 2012).

Identify current climate-related risks and vulnerabilities and project their future changes. Key components of an adaptive governance framework are the capacity to monitor local socio-ecological processes and implement a dynamic institutional response based on the information gathered from socio-ecological assessments. Highly aggregated data can not provide detailed information regarding a community's habitability and vulnerability to ecological changes (Dietz et al., 2003).

Kivalina, Shishmaref, and Newtok each documented the occurrence and damage from severe winter storms that increasingly threatened their lives and property. These assessments were confirmed by multiple agency reports. Global and Alaskan regional climate models project that severe winter storms will increasingly occur during ice-free conditions and that their erosional impact will be amplified by continued loss of protective sea ice (Jones et al., 2009; Mars and Houseknecht, 2007; Walsh et al., 2008). The integration of local assessments with regional and national assessments can foster multi-level collaboration and well-structured dialogue between scientists, community leaders, and government representatives to develop adaptation strategies that minimize the increasingly evident societal risks of these climate changes (Dietz et al., 2003; NRC, 2010). Those groups most directly affected by climate-induced biophysical changes need to participate in identifying climate-related risks by gathering data and making decisions about the most appropriate institutional response to the hazard (May and Plummer, 2011).

Adapt to current climate extremes through known adaptations and adapt to novel impacts by exploring outside-the-box adaptation strategies. Through funding for disaster relief, federal and state agencies spent about $32 million on erosion control

projects intended to reduce erosion and risks to life and property in the current locations of our three study communities. In Shishmaref, the USACE determined in 2004 that the community needs $90 million for infrastructure upgrades and erosion protection measures within 15 years (TetraTech, 2004). Alternatively, these funds could be used for relocation. Residents and agencies responsible for erosion and flood control concurred that our three study communities cannot be protected from erosion and severe storms in their current locations and that community relocation is the only viable adaptation option. However, as described above, relocation has begun in only one of our study communities despite a generation of persistent effort because policies are inconsistent with the only viable adaptation option (relocation), and there is no funding or governance mechanism to implement this adaptation.

The general public and policy makers are most likely to understand and take action to reduce risks from extreme events that currently cause widespread threats to life and property (APA, 2010; Yohe, 2009). Programs to reduce societal impacts of climate-change-induced extreme events have been implemented for urban heat waves (Ebi et al., 2004), sea level rise and coastal storms (CSO, 2009; NRC, 2006), floods, and drought (Garrick et al., 2009). However, many climate-change impacts will be novel (e.g., autumn storms during ice-free conditons), requiring outside-the-box multiple-loop learning to generate novel solutions (e.g., village relocation) (Armitage et al., 2007; NRC, 2010).

Integrate ecological integrity and societal well-being. Newtok's selection of a relocation site met the needs of both ecological integrity (no high-ice-content permafrost

and not highly susceptible to long-term coastal erosion or sea-level rise) and cultural integrity (continued opportunities for community cohesion and subsistence hunting activities). By including biophysical, cultural, and socioeconomic criteria in relocation planning, the relocation plan received widespread support from both community residents and agencies seeking to assist with community relocation. Agency opposition to the relocation sites proposed by Kivalina and Shishmaref on the grounds of permafrost instability was a key impediment to relocation progress by those communities.

Integrate climate-change adaptation with other societal goals. Although community relocation is the most urgent challenge facing our three Alaskan communities, current infrastructure design creates other hardships such as high heating costs due to poor insulation, public health risks from inadequate sewage treatment, undependable fuel supply due to degraded barge landing facilities, and high-maintenance, expensive, and inadequate water treatment, as observed in all three of our study communities. Village relocation provides an opportunity to address these other societal issues to foster long-term sustainability in the process of relocating communities. Mainstreaming of climate-change policies with other agency mandates increases the likelihood of efficient implementation (Commonwealth of Australia, 2009; NYCPCC, 2010) and of accounting for the interactions between climate-induced impacts and other stresses (NRC, 2010).

Bridge among formal organizations to facilitate communication, collaboration, and social learning. The Newtok Planning Group was an informal bridging organization that worked intensively for two years to develop a relocation

strategy despite the lack of any official relocation mandate for participation in the group. The collaboration that occurred created innovative solutions that were less likely to have emerged through formal channels. It remains to be seen whether the social capital thus created will contribute to relocation efforts of other villages. In general, bridging organizations and informal networks create new spaces where learning can occur and which are less constrained by the formal mandates of participating groups (Folke et al., 2005; Margerum, 2008; Olsson et al., 2004). Bridging organizations may be particularly important in devising novel adaptation options or governance structures that may improve the fit with the new conditions created by climatic and other global changes, for example the seasonally ice-free conditions and new sovereignty issues in a warming Arctic Ocean (Berkman and Young, 2009).

Seek interdisciplinary, multi-sector engagement that fosters local leadership and engages local governing institutions in identifying potential solutions. The breadth of stakeholder engagement by tribes, state and federal agencies, and NGOs in the Newtok Planning Group contributed to its success by reducing the likelihood that each agency and stakeholder group pursue a separate and partially incompatible agenda (silos). Power-sharing and joint decision-making allowed learning to occur and created trust among participating groups (May and Plummer, 2011). Leadership of the Newtok Planning Group by the Newtok Traditional Council ensured that solutions were place-based, local in scale, and understood and accepted by community residents. State and federal agencies along with non-profit organizations, which have access to resources, geotechnical equipment to assess relocation sites, and expertise to build infrastructure,

provided technical assistance to facilitate the community relocation. The Newtok Planning Group's collaborative governance structure, which recognized the need to address housing, transportation, and utilities as essential components of an integrated relocation strategy, has been essential in order to move Newtok's relocation effort forward. Similarly, comprehensive multi-sector planning has been critical for complex adaptation planning at city, state, and national levels and is an important strategy to reduce and manage risk to climate extremes and disasters (Lavell et al., 2012; NYCPCC, 2010).

3.5.3 Policy Implications

Although climate-change adaptation planning is relatively recent (mostly since 2005) (NRC, 2010), some strategy elements for climate-change adaptation are relatively well developed (e.g., assessment, planning for extremes) (Adger et al., 2009; NRC, 2010). Our analysis suggests that climigration and other climate-change adaptation efforts require institutions to prepare for a continuum of potential responses that includes post-disaster recovery, protection in place (e.g., seawall and shoreline protection), hazard mitigation, and relocation. With respect to climigration in the U.S., we recommend the following:

- Amendment of federal policies such as the Stafford Act to include gradual and recurring climate-induced ecological processes would allow the President to declare such circumstances a disaster and release federal funds for pre-disaster

hazard mitigation (42 U.S.C. § 5122) and planning as a response to climate change.

- Change in federal and state statutes to specifically permit federal disaster relief funding to be used and federal agencies to participate in building new infrastructure and relocating an entire community at a relocation site when durable adaptation is impossible in the current location.

These two amendments would allow a community threatened by climate-induced ecological changes to shift seamlessly from a disaster recovery to community relocation. The creation of this framework is essential in order to avoid repeated humanitarian crises when communities are faced with chronic extreme weather events that accelerate ecological change. In other cases where the limits of current adaptation efforts are exceeded (e.g., water supply less than mandated water rights), adaptive governance will be equally important in identifying new adaptive solutions.

3.5.4 Conclusion

Climate-induced ecological change threatens the lives, livelihoods, homes, health, and basic subsistence of human populations. Governments and insurance companies may not be able to sustain the cost of rebuilding infrastructure repeatedly damaged or destroyed by these changes. Relocation may be the best adaptation response if the community's current location is uninhabitable, or relocation reduces vulnerability to future climate-induced ecological threats. We have outlined an adaptive governance framework that can respond to rapid directional ecological change involving extreme

weather events to foster resilience in the face of these changes. Testing this framework for village relocation in Alaska provides an opportunity to learn and adaptively design institutional frameworks for a broader range of climate-change impacts in the U.S. and globally.

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Table 3.1. Strategies that foster adaptive governance to climate change. None of these strategies is essential or by itself guarantees success, but each contributes to the potential success of strategies for adapting to climate change. Adapted from NRC (NRC, 2010).

Adaptation strategy elements	Alaskan community relocation examples	Literature examples
Identify current climate-related risks and vulnerabilities and project their future changes	Document increasing frequency and damage from severe autumn storms	Hurricanes (Kates et al., 2006), sea level rise (Nicholls et al., 2007), agricultural disruption from drought (Commonwealth of Australia, 2009)
Adapt to those current climate extremes that are projected to become more pronounced	Armor coastline to prevent damage from coastal storms	Coping with heat waves (Ebi et al., 2004), extreme storm tides (NYCPCC, 2010), extreme drought (Commonwealth of Australia, 2009)
Identify limits to current adaptation options and explore viable alternatives	Relocate community when community-threatening flooding and erosion cannot be prevented	Adaptive retreat from vulnerable coasts (Kates et al., 2006; Nicholls et al., 2007), agricultural relocation (Commonwealth of Australia, 2009)
Integrate ecological integrity and societal well-being	Select relocation sites without high-ice-content permafrost and that are culturally appropriate	Integration of environmental and societal goals (NYCPCC, 2010)
Integrate climate-change adaptation with other societal goals	Integrate community relocation with sustainable design of the relocated community	Mainstreaming of climate-change policies with other agency goals (Commonwealth of Australia, 2009)
Bridge among organizations to facilitate communication, collaboration, and social learning	Foster engagement among interested parties outside of formal governance structures (Newtok Planning Group)	Shifting resource development and sovereignty issues in an ice-free Arctic Ocean (Berkman and Young, 2009)
Seek interdisciplinary, multi-sector engagement that fosters local leadership and engages local governing institutions in identifying potential solutions	Community resident voter approval of relocation site. Village tribal council leads relocation with government agencies providing technical assistance (Newtok Planning Group)	Global leadership for climate mitigation; regional leadership for coastal zone development; local leadership for site-specific responses (NRC, 2010)

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3.8 Appendix

Supporting Online Material To Chapter 3

The villages of Kivalina, Shishmaref, and Newtok recognized decades ago that community relocation was the only solution to protect their respective communities from life-threatening biophysical change. These supporting materials provide more detail about each community's efforts to relocate.

Kivalina has been working on its village's relocation since 1953 and has held five elections related to relocation (Gray, 2010). About 360 people currently live in Kivalina (USACE, 2006). In 2006, six years after the 2000 relocation vote, the USACE funded a master relocation plan. The study had two goals: to assist Kivalina residents in choosing a relocation site and to create a relocation planning process (USACE, 2006). The study evaluated six relocation sites, reviewed the previous ten studies documenting the social and ecological impacts of erosion and flooding and evaluating Kivalina's relocation plan, and found that the community's relocation site Kiniktuuraq, chosen in 2000, was "vulnerable to erosion and must be armored using armor rock and riprap" (USACE, 2006).

In September 2006, federal government leaders arrived in Kivalina to celebrate the finalization of a multi-million dollar seawall. Prior to the commencement of celebrations, a storm damaged 160 feet of an 1800-foot seawall and caused the officials to cancel the celebration (deMarban, September 15, 2006). One year later, in September

2007, a storm once again threatened the community; its residents feared that the seawall would not provide adequate protection and therefore evacuated their community in search of safety (Bragg, September 14, 2007; Bragg, September 15, 2007). After the 2007 evacuation, the USACE approved construction of a large rock revetment project with a design life of only 15-20 years (ANTHC, 2011).

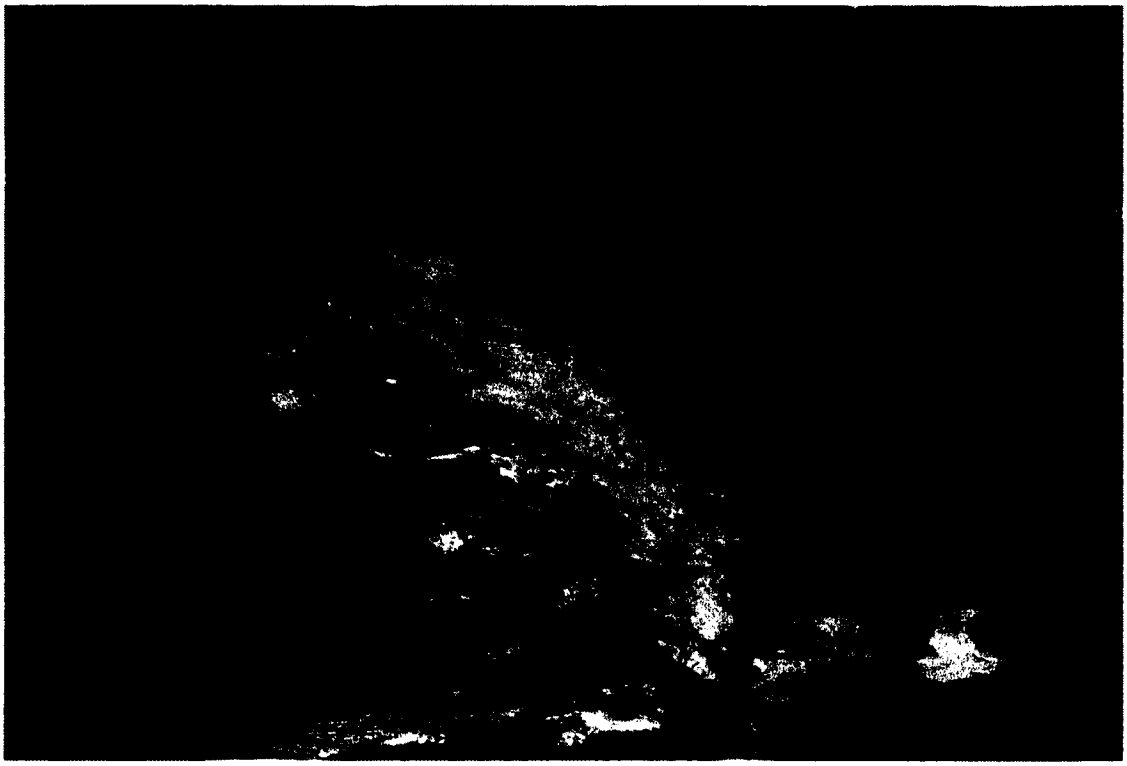

Figure 3.1: Kivalina
Kivalina is located on the tip of a 6-mile–long barrier island in the Chukchi Sea and protected by a rock revetment. Photo by Robin Bronen.

Shishmaref is located on Sarichef Island, a barrier island separates the Chukchi Sea from a saltwater lagoon. Sishmaref residents first decided to relocate in 1973 when a storm eroded 30 feet of shoreline (SERC, 2002). Twenty-five years later, in October 1997, an autumn storm caused severe erosion and required 14 homes and the National Guard Armory to be relocated within the current village site (USACE, 2006). The following year, the Alaska Department of Transportation (DOT) conducted an erosion assessment and estimated the imminent loss of 22 homes from the accelerating erosion (SERC, 2002). This storm and the subsequent erosion assessment precipitated an earnest effort to relocate the community.

Federal government agencies have studied the erosion and relocation issue since 1996, but the actual relocation of the community has not yet started (SERC, 2002). In 2003, the US Department of Agriculture Natural Resources Conservation Services facilitated a community-led planning effort and evaluated eleven potential relocation sites (BEESC, 2010). In 2004, the Shishmaref Erosion and Control Coalition facilitated a community-wide vote, which resulted in choosing Tin Creek as the preferred relocation site (BEESC, 2010). Due to disagreement about the long-term habitability of the relocation site due to thawing permafrost, the community has still not relocated.

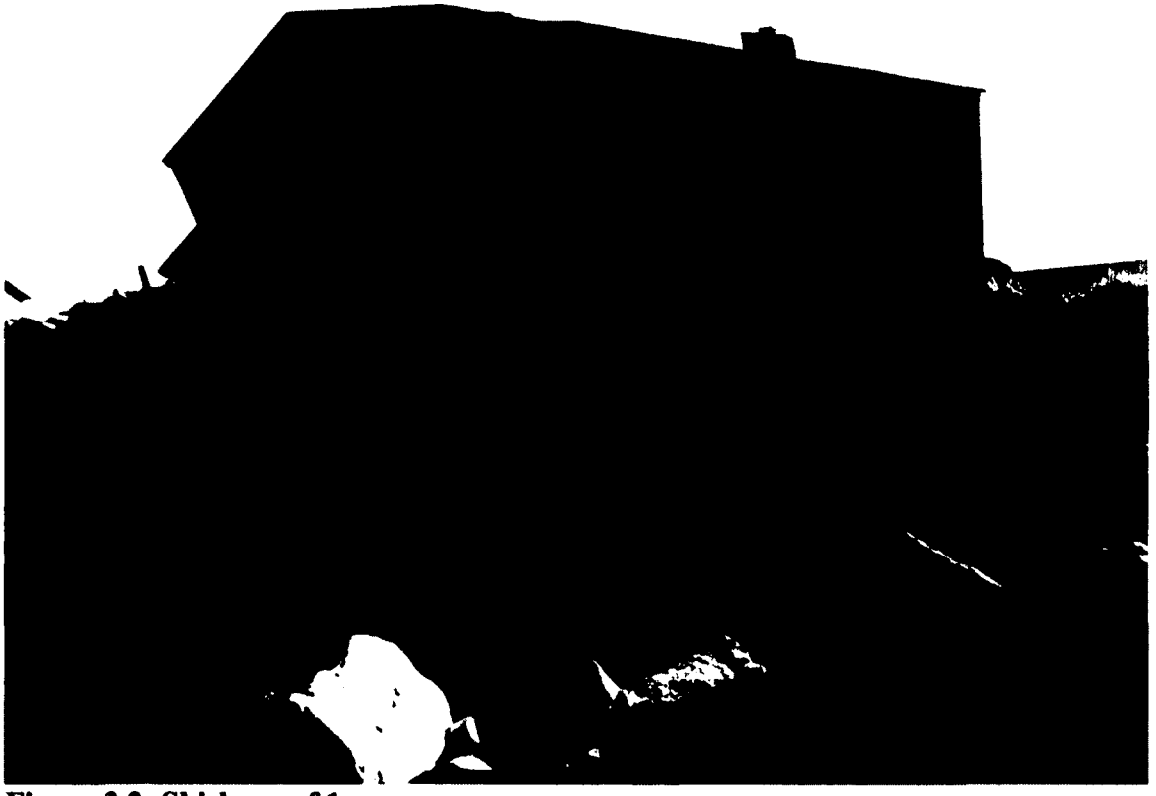

Figure 3.2: Shishmaref 1
House falling due to erosion. Photo by Tony Weyiouanna

Figure 3.3: Shishmaref 2
Erosion caused by 2005 fall storm. Photo by Tony Weyiouanna.

Newtok is located within the Yukon-Kuskokwim Delta, one of the largest river deltas in the world, and surrounded by marshy tundra and lakes (Cox, 2007). The Ninglick River borders Newtok to the south; to the east is the Newtok River (USACE, 2008). Newtok is a Yup'ik Eskimo village with 321 residents and about 60 houses. Erosion is causing the Ninglick River to move closer to the village of Newtok. The community has monitored erosion rates of the Ninglick River since1983. In 1950, more than one mile separated the Ninglick River from the homes of community members (Cox, 2007). In 1994, the Newtok Traditional Council started a relocation planning process and analyzed relocation to six potential sites. Ten years later, in 2004, the Newtok Traditional Council commissioned a report to provide background documentation to government agencies and officials to justify the efforts of the village to relocate and to support requests for government assistance in this process (ASCG, 2004). Newtok inhabitants voted three times, in September 1996, May 2001, and August 2003, to relocate to Nelson Island, nine miles from Newtok.

Figure 3.4: Newtok 1:
Newtok erosion. Photo by Robin Bronen

Figure 3.5: Newtok 2
Newtok erosion. Photo by Robin Bronen

Figure 3.6: Newtok Boardwalk 1
Boardwalk leading between the homes of residents is fully submerged in the aftermath of a severe storm. Photo by Stanley Tom

Figure 3.7: Newtok Boardwalk 2
Boardwalk leading between the homes of residents is fully submerged in the aftermath of a severe storm. Photo by Stanley Tom

Figure 3.8: Newtok Fuel Tanks
Flooding waters threaten Newtok's limited fuel supply. Photo by Stanley Tom

Figure 3.9: Newtok Home
Floodwaters have destroyed Newtok's homes and infrastructure. Photo by Stanley Tom

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GENERAL CONCLUSION

This dissertation examines the nexus between climate change and human mobility. Specifically, it focuses on community relocations as a form of community-based adaptation, which can improve the standard of living of community residents and protect their human rights. Community relocations are an extreme consequence of climate-induced environmental change and present an unprecedented challenge to governance institutions at local, regional and national levels. Although this dissertation focuses on the relocation of indigenous communities, the research is relevant more broadly to community-based adaptation to climate change which fosters resilient livelihoods, poverty reduction and improvement of living standards (Armitage, 2007; Doubleday, 2007).

Chapter 2 is a case study of the relocation of Newtok. Through Newtok's case study, I have tried to illuminate how climate-induced environmental changes, such as decreased arctic sea ice and thawing permafrost, combine with extreme weather events to impact the habitability of an entire community's environment and causes permanent community relocation. Newtok's relocation also provides an opportunity to examine how existing laws in the United States, designed to respond to disasters, are inadequate to respond to the climate change environmental events that are endangering the lives of community residents. The exclusion of on-going environmental processes from the federal definition of "disaster" prevents people who are threatened by these processes

from receiving disaster relief and hazard mitigation assistance. This is a significant gap in the current US statutory framework.

Chapter 3 outlines the relocation efforts of three Alaskan Native communities, Kivalina, Shishmaref and Newtok. Based on a comparative analysis of these three communities, the chapter further examines the institutional constraints to relocation in the United States and identifies components of a toolkit and policy changes that can facilitate community-based adaptation strategies to foster community resilience and protect the human rights of community residents.

My research, which forms the foundation for this dissertation, began in 2007 during the International Polar Year when scientists focused their research on the polar regions of the world. During the five years I have done this research, the environment has changed dramatically as a consequence of climate change. Less sea ice covers the Arctic Ocean today than at any time in recent geologic history (Polyak et al., 2010).

Satellite images of the Arctic sea ice extent have been recorded since 1979 (Polyak et al., 2010). Scientific observations of the Arctic sea ice extent during the summer of 2007, my first year of graduate school, documented a new record low, with twenty-three percent less ice coverage measured than the previous record of September 2005, a loss equivalent to the size of California and Texas combined (Polyak et al., 2010). In 2007, scientists believed that the record low was an anomaly and not a signal of fundamental changes in ice dynamics of the Arctic Ocean.

Arctic sea ice extent has continued to set record lows, with the six lowest seasonal minimum ice extents in the satellite record occurring since 2007 (NSIDC, 2012a). The

National Snow and Ice Data Center documented a new record low in September 2012 (NSIDC, 2012a). This record low is significant for several reasons. First, the sea ice extent dropped below the 2007 low on August 26, approximately three weeks before the minimum sea ice extent is traditionally recorded in September of each year. Second, the sea ice extent, for the first time since 1979, is below 4 million square kilometers, 18% below 2007 and 49% below the 1979 to 2000 average (NSIDC, 2012b).

Arctic sea ice extent and thickness are harbingers of the dramatic changes caused by increased amounts of carbon dioxide in the atmosphere (Polyak et al., 2010). For the coastal communities in Alaska, the decreased sea ice extent, along with thawing permafrost, is accelerating erosion and critically affecting the habitability of these communities' environments. In 2007, former Alaska Governor Sarah Palin recognized the need to develop a statewide strategy to respond to the impact of climate change and officially formed the Alaska Climate Change Sub-Cabinet (Office of the Governor, 2010). The Sub-Cabinet was charged with "building the state's knowledge of the actual and foreseeable effects of climate warming in Alaska, developing appropriate measures and policies to prepare communities in Alaska for the anticipated impacts from climate change, and providing guidance regarding Alaska's participation in regional and national efforts addressing the causes and effects of climate change" (Office of the Governor, 2010).

The Alaska Climate Change Sub-Cabinet established the Immediate Action Workgroup (IAWG) in 2007 to identify the immediate needs of the communities imminently threatened by the effects of erosion, flooding, permafrost degradation, and

other climate change-related impacts (IAWG, 2008). Deputy Commissioner of the Department of Commerce, Community and Economic Development, Michael Black, and Patricia Opheen, Chief of the Engineering Division of the Alaska District of the US Army Corps of Engineers, were co-chairs of the Immediate Action Workgroup (IAWG, 2008). The IAWG was instrumental in advancing to the Alaska State Legislature funding recommendations for imperiled communities so that they could receive the necessary financial resources to respond to the environmental threats caused by climate change. The Immediate Action Workgroup also issued two reports outlining several recommendations to respond to the needs of the imperiled communities located along Alaska's coast and rivers (IAWG, 2008; IAWG, 2009).

In November 2007, the first meeting of the Immediate Action Workgroup occurred in Fairbanks, Alaska (IAWG, 2007). Residents of the three most climate-imperiled Alaska Native communities, Kivalina, Shishmeref and Newtok, gave presentations to Michael Black and Patricia Opheen and described the climate change impacts which were threatening the lives of their community members (IAWG, 2007). Tony Weyiouanna, the representative from the Shishmaref Erosion and Relocation Coalition ended his presentation by stating:

> The no action option for Shishmaref is the annihilation of our community by dissemination. We are unique, and need to be valued as a national treasure by the people of the United States. We deserve the attention and help of the American people and the federal government. . .

> [We request] [t]hat Shishmaref be used as a State/federal demonstration project with maximum flexibility to determine what changes need to be made to lower the cost and impact of relocation, identify a State or Federal champion to facilitate State and federal agency coordination for relocation of communities. . .
>
> Shishmaref, we are worth saving. (IAWG. 2007).

Stanley Tom, tribal administrator for the Newtok Traditional Council, presented for Newtok:

> The challenges:
>
> No agency has authority to lead relocation efforts.
>
> No funding specifically for relocation.
>
> "Patchwork" funding from agencies and grants.
>
> Getting funding takes time that we don't have. We can't keep up with the erosion (IAWG, 2007).

The issues identified by Stanley Tom and Tony Weyiouanna during the November 2007 IAWG meeting persist. These communities continue to be imperiled. In Kivalina, the State of Alaska declared a disaster emergency in August 2012 because of record rainfall, which raised the water level of the two rivers closest to the community flooding the village landfill, spreading contaminated waste and infecting the village water supply (Office of the Governor, 2012a; Office of the Governor, 2012b).

None of the three communities has relocated. Newtok continues to be the only community that has identified a relocation site (which has been accepted by state and federal government agencies), and initiated the building of infrastructure at their

relocation site. However, Newtok is plagued by a painfully slow relocation process with no clear timeline for when community members will be able to relocate.

In addition, the last meeting of the Immediate Action Workgroup occurred in March 2011 because the Workgroup failed to receive authorization from Governor Parnell or the Subcabinet on Climate Change to continue its work (IAWG, 2011a; IAWG, 2011b). The dismantling of the Immediate Action Workgroup creates a tremendous gap for communities faced with climate-related threats.

Moreover, the relocation challenges faced by Kivalina, Shishmaref and Newtok exemplify the need to create a governance structure which can better respond to the needs of communities when their environments are no longer habitable because of climate change. The State of Alaska has created a critical program, Alaska Climate Change Impact Mitigation Program (ACCIMP), which funds strategic planning assessments for imperiled communities. This is an important first step to addressing the needs for communities facing displacement because of climate change. However, as the General Accounting Office (GAO, 2009) noted, no similar initiative exists at the federal government level and no comprehensive governance framework exists that can evaluate when communities and government agencies need to shift their work from protection in place to community relocation. The creation of this adaptive governance framework, which can dynamically respond to the needs of communities as climate change impacts habitability and the safety of residents, is critical. The United States should lead this effort and implement legislation to provide governance tools and resources so that communities forced to relocate due to climate change can be resilient. In this way, the

United States can create a model adaptation strategy that facilitates an effective transition from protection in place to community relocation that governments throughout the world faced with climigration can implement.

Finally, human rights protections must be embedded in any governance structure created to relocate communities. The relocation process led by the Newtok Traditional Council provides a model of how to incorporate human rights protections into the relocation process. The United Nations needs to guide the development of these human rights principles so that nation state governments protect the human rights of their citizens as they implement adaptation strategies to protect vulnerable populations from climate-induced displacement. Any international instrument regarding climate-induced displacement should prioritize these nation state obligations to protect and provide mechanisms to build institutional and resource capacity because a lack of resources could be a primary motivator for displacement (Docherty and Giannini, 2009).

Such human rights principles could be identified as "Guiding Principles of Climigration," which would serve to create a common language to guide the international, national and local humanitarian response. Such Guiding Principles of Climigration would identify the appropriate human rights standards to guide national government actions when climate-induced ecological change threatens the habitability of an environment and the lives of community residents. Furthermore, these principles would serve to protect the human rights of community residents faced with displacement as a result of catastrophic environmental change.

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APPENDIX A

FORCED MIGRATION OF ALASKAN INDIGENOUS COMMUNITIES DUE TO CLIMATE CHANGE*

A.1 INTRODUCTION

In the Arctic, climate change is evident and occurring at a faster rate than other parts of the planet. The 2007 physical science report of the Intergovernmental Panel on Climate Change (IPCC, 2007) confirms that temperatures in the Arctic have increased by approximately twice the global average between 1965 and 2005 (IPCC, 2007: 339). Since 1975, temperatures in Alaska have increased by an average of 2 to 3.5 degrees Celsius. In addition, Arctic sea ice is decreasing in extent and thickness, wildfires are increasing in size and frequency and permafrost is thawing. These ecological phenomena are creating a humanitarian crisis for the indigenous communities that have inhabited the arctic and boreal forest for millennia. Approximately 200 indigenous villages are located along the navigable waters of Alaska's coasts and rivers. Dozens of these communities are threatened because of accelerated rates of erosion or flooding due to climate change. Governments are struggling to respond. The traditional adaptation strategies of hazard prevention and disaster relief are no longer protecting communities. Relocation of the communities is required.

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This paper adds to the body of research focused on defining the nexus between climate change and human migration. The empirical research discussed in this paper identifies a migration typology, permanent relocation, which specifically links climate change with human migration and demonstrates that new institutions need to be created in order to protect the human rights of those forced to migrate and prevent humanitarian crises. An accurate definition of this displacement category is essential in order to ensure that the permanent relocation of communities only occurs when there are no other durable solutions. A precise definition is also critical to the design and implementation of institutional frameworks of humanitarian response. This institutional framework needs to be based in human rights doctrine and created at the local, national and international level.

A.2 Identifying the Nexus Between Climate Change and Human Migration

Climate change will create disparate environmental impacts that force people and communities to migrate. Erosion, flooding, and sea level rise will be the primary causes of displacement. Water and food security issues, due to drought and salt water intrusion, will also impact the sustainability of communities and cause migration.

The disparate drivers of climate-induced migration can be segregated into three distinct categories: random extreme weather events, such as hurricanes and tornadoes, the depletion of ecosystem services, such as drought and salt water intrusion, and on-going ecological changes caused by the combination of random extreme weather events and depletion of ecosystem services that severely impact public infrastructure, such as

health clinics and schools, as well as the livelihoods and lives of the people residing in the community.

These climate change drivers cause distinct patterns of human migration. The three migration typologies are: the migration of individuals and households where climate change is one of several factors causing migration, mass migration where entire communities are forced to temporarily evacuate and mass migration where entire communities are forced to permanently relocate. Each migration typology requires a distinct institutional adaptation strategy to ensure that the humanitarian response is appropriate and that people's human rights are protected.

Research has primarily focused on the first migration typology and has documented the difficulty in demonstrating the nexus between climate change and migration. These studies primarily focus on the depletion of ecosystem services as the primary climate change factor that causes the migration of individuals and households. Some of the studies do not distinguish between ecosystem depletion caused by human overuse of resources and ecosystem depletion caused by climatic events, such as drought (Hugo, 1996; Morales, 2008). This distinction is critical when implementing institutional adaptation strategies.

Socio-economic factors create the difficulty in isolating climate or environment as a significant or exclusive factor that causes migration. In Leighton's (2008) survey of desertification and drought- related migration, population growth, household income, social networks and employment opportunities intertwine with climate factors as the

causes for migration. Migration is seen as one of many coping strategies to alleviate poverty.

In the recent International Organization for Migration (IOM) publication, "Climate Change and Migration: Improving Methodologies to Estimate Flows", the authors review several case studies which analyze the connection between drought and migration. These studies focus on the consequences of ecosystem depletion on livelihood decisions and primarily analyze the decision-making process of individuals and households to assess the likelihood of migration. The research affirms that a multiplicity of socio-economic factors, along with climate change, push people to migrate (Kniveton et. al., 2008: 33-34).

Similarly, Hugo (1996) argues that climatic causes of migration are difficult to segregate from the "pre-disposing" socio-economic factors such as population density, poverty and resource use (Hugo, 1996: 109). Although his research did not distinguish between ecosystem degradation caused by human overuse of resources and ecosystem depletion caused by climate change, his analysis reveals the difficulty in defining the nexus between migration and climate change when ecosystem depletion is the climate change factor driving the migration.

The IOM climate change and migration study also examines the mass population displacement caused by random environmental events, where communities are temporarily evacuated and infrastructure is rebuilt with the expectation that people will return home. In this context as well, research has focused on the migration patterns of individuals or households who choose not to return home. In some of these studies,

researchers identified socioeconomic status as a factor that contributes to the migration decision and demonstrated again the difficulty of segregating climate from other reasons that cause people to migrate (Kniveton et. al., 2008: 35).

The focus of this paper is on the third migration typology, permanent relocation caused by an on-going depletion of eco-system services created by consistent extreme weather events or climate-induced change, such as sea level rise. "Climigration" is the word that best describes this type of human migration. Climigration occurs when a community is no longer sustainable exclusively because of climate-related events and permanent relocation is required to protect people. The critical elements of this migration typology are that climatic events are on-going and repeatedly impact public infrastructure and threaten people's safety so that loss of life is possible. This type of human migration is occurring in Alaska. Catastrophic random environmental events, such as tornadoes and hurricanes, do not cause climigration. However, these random environmental events, if on-going, may alter ecosystem services permanently, cause extensive damage to public infrastructure, repeatedly place people in danger and require communities to relocate.

A.3 Climate-Induced Migration in Alaska

Erosion and flooding have plagued the hundreds of indigenous villages that are located along the coast and rivers of Alaska for decades. These communities rely on easy access to navigable waters to hunt marine mammals and fish in order to subsist. Subsistence is central to their culture and survival. Arctic sea ice and frozen tundra are essential ecosystem services. Arctic sea ice has, in the past, protected communities from

coastal erosion and flooding by creating a barrier to storm-related waves and surges. Along the northwestern Alaskan coast permafrost, permanently frozen subsoil, is continuous and the glue that keeps the land intact and habitable.

Climate change is depleting these ecosystem services and accelerating the rates of erosion. The complex interplay of ecological feedback loops is now endangering the lives of the inhabitants of these communities. As Mark Serreze, senior snow and ice scientist in Boulder Colorado, stated in a newspaper interview in December 2007, "The Arctic is screaming." (Borenstein, 2007). Temperatures along the northern Alaskan coast have increased by an average of 3.5 degrees Celsius during the winter since 1975 (Shulski et. al., 2007:134). These warming temperatures are causing the permafrost to thaw and the Bering and Chukchi Seas to freeze later in the autumn. The 2007 IPCC physical science report has documented that the temperature of the top layer of permafrost has increased by up to 3 degrees Celsius since the 1980s (IPCC, 2007:339).

At the same time, arctic sea ice is decreasing in thickness and extent. Recent research concluded that the North Pole had a 50 percent chance of being ice-free during the summer of 2008 (Borenstein, 2008). Record minimum levels of arctic sea ice have been recorded since 2002. The decrease in extent of arctic sea ice coupled with warming temperatures has caused a delay in freezing of the Bering and Chukchi Seas. Near shore pack ice has historically provided a protective barrier to coastal communities. Research has documented that since the 1980s; the arctic seas are remaining ice-free approximately two months longer in the autumn (US Army Corps of Engineers, 2006). The delay in freezing of the arctic seas has left many communities exposed to the autumnal storms that

originate in the Pacific and occur primarily between August and early December. Bering Sea storms are not hurricanes but do have hurricane strength in the damage they can cause on the coast due to wave action and storm surges (Atkinson, 2007). The loss of arctic sea ice coupled with thawing permafrost is causing severe erosion and storm surges that are threatening the lives of the inhabitants of several communities.

Five indigenous communities, located along the western outer coast of Alaska on the Bering and Chukchi Seas, have concluded that relocation is the only durable solution to the climatic events that are threatening their lives. These communities are witnessing dramatic climate shifts that are impacting community infrastructure as well as the safety of the people who reside within each community. Government agencies recognise that each of these communities is imminently threatened by erosion and flooding and are struggling to meet the enormous new needs of these communities. Up until 2006, local, state and federal government agencies have responded within the context of disaster relief. Millions of dollars have been spent on shoreline protection and consulting firms to study the issue of erosion and relocation. Government agencies now realise that erosion control, the traditional disaster relief response, is a short-term solution and no longer able to protect the inhabitants of these coastal communities. In 2006, a United States government report found that a catastrophic climatic event could submerge three of these communities within 10-15 years of the report's publication (US Army Corps of Engineers, 2006).

This paper focuses on three communities identified in the 2006 US government report. The tribal governments of Newtok, Shishmaref and Kivalina recognised several

years ago that relocation was the only durable solution that would protect their respective communities. Each community has been engaged for years in an ad hoc process to secure state and federal government assistance in their relocation efforts. The residents of each community have voted and decided that their preferred relocation alternative is to move to a new site and recreate their community. Each community has commissioned several studies to engage in a socio-ecological assessment and evaluate the relocation process. All studies demonstrate the complexity of the issues each community faces, if relocation occurs. The cultural, social, economic and psychological impact of the displacement is incalculable.

A.3.1 Newtok

Newtok is a traditional Yu'pik Eskimo village located along the Ninglick River near the Bering Sea. The village site is within the Yukon-Kuskokwim Delta, one of the largest river deltas in the world, and surrounded by marshy tundra and thousands of lakes (Cox, 2007). The people of Newtok are known as "Qaluyaarmiut" or "dip net people" whose ancestors have inhabited the Bering Sea coast for at least 2000 years (ASCG, 2004). According to the 2000 Census, 321 people reside in the community (ASCG, 2004). The only access to the community is by barge during the summer or airplane.

Newtok has made the most progress in its relocation efforts; in 2003, the Newtok Native Corporation secured land ownership to a relocation site through a legislative act of the United States Congress. The new community is located nine miles south of Newtok

across the Ninglick River and has been named Metarvik, which in Yu'pik means "getting water from the spring" (Cox, 2007).

The change of the Ninglick River course is causing severe erosion of the river bank adjacent to the village. Climate change is impacting the rate of erosion, which is caused by a combination of increased temperatures, thawing permafrost, wave action and river current (Cox, 2007). Erosion, flooding and salt water intrusion are threatening the community. Critical public infrastructure is being washed away (Cox, 2007: 8-11). The barge landing, which provides summer access to the community for supplies and fuel for heating, no longer exists and is causing a fuel crisis. Salt water is affecting the potable water. Community inhabitants are experiencing mental and physical health issues associated with the decline of ecosystem services, such as potable water (Cox, 2007: 8).

The community has monitored the erosion rates of the Ninglick River for decades. In 1994, the Newtok Traditional Council started a relocation planning process and analysed relocation to six potential village relocation sites. The Newtok Traditional Council also considered relocation to three already existing villages with residents of Newtok being dispersed between them (ASCG, 2004). Ten years later, the Newtok Traditional Council commissioned a report to provide background documentation to government agencies and officials to justify the efforts of the village to relocate and to support requests for government assistance in this process (ASCG, 2004).

In 2006, an Alaska state agency created the Newtok Planning Group to specifically address the short-term emergency needs of the community and to begin a relocation planning effort. Approximately twenty-five different tribal, state and federal

government representatives participate in the Newtok Planning Group (Cox, 2007:13). The state agency coordinates their work, but has no dedicated funding to relocate the community and no jurisdictional authority to require other agencies to perform work needed for the relocation. For these reasons, the Newtok Planning Group has encountered numerous hurdles that have slowed their progress.

The Newtok Traditional Council built three homes at their new village site, Metarvik, in September 2006. The Alaska Department of Transportation and Public Facilities, a member of the Newtok Planning Group, plans to build the barge landing at Metarvik during the summer of 2009 (Cox, 2007: 13-18). The tribal government believes that their village must be relocated by 2012 to avoid a greater humanitarian crisis.

A.3.2 Kivalina

Kivalina is an Inupiaq Eskimo village located on a barrier island in the Chukchi Sea, approximately 80 miles above the Arctic Circle. Residents of Kivalina have lived at this location for at least 150 years. Approximately 360 people currently live in Kivalina (Swan, 2007a). Subsistence is the lifeblood of the community. The Native Village of Kivalina, a federally recognised indigenous tribe, has been working on its village's relocation for several decades (Swan, 2007b). Erosion has historically been a concern for the community. In 1963, the Native Village of Kivalina voted on relocation, but a majority of residents did not want to move, so the community remained in its present location (Swan, 2007a). In 1998, the community voted a second time on the relocation issue and decided to relocate. The community chose a relocation site (Swan, 2007a).

Federal government agencies later determined that the chosen site was unsuitable for community development because of permafrost (Tryck, Nyman Hayes, 2006). The community voted on relocation a third time in 2000 and chose a different relocation site (Swan, 2007a). Despite this 2000 vote, the community has not begun to relocate, because federal government agencies believe that the second site chosen by the community is also unsuitable for relocation (Swan, 2007a).

At the present time, erosion is causing multiple harms to the community, including loss of critical public infrastructure and transportation access to the community. Air and sea are the only two methods of access to the community. The silt build-up from erosion is affecting summer barge access to Kivalina, and erosion caused by sea storm surges is impacting the community's airstrip. In addition, private homes have had to be relocated into the interior of the barrier island (Tryck, Nyman Hayes, 2006: 6). Erosion is also threatening the stability of the solid waste storage containment area on the island, which could create an environmental catastrophe for the surrounding bodies of water (Tryck, Nyman Hayes, 2006:5-6).

Erosion control continues to be the primary focus of government assistance. In September 2006, federal government leaders arrived in Kivalina to celebrate the finalization of a multi-million dollar seawall. Prior to the commencement of celebrations, a storm damaged 160 feet of an 1800 foot seawall and caused the officials to cancel the celebration (deMarban, 2006). One year later, in September 2007, a storm once again threatened the community, and its residents feared that the seawall would not provide

them with protection. 250 Kivalina residents evacuated their community in search of safety (Bragg, 2007b).

Recently state funding has been allocated to start a relocation planning process. The community believes that they must be relocated within the next five years to prevent a greater humanitarian crisis (Black and Opheen, 2008).

A.3.3 Shishmaref

Shishmaref is a traditional Inupiat Eskimo community located on Sarichef Island on the northwest coast of Alaska. The barrier island separates the Chukchi Sea from a saltwater lagoon on the leeward side of the island. The residents of Shishmaref have lived on the island for several centuries and actively subsist (Weyiouanna, 2007). Access to the ocean is essential to their survival. For several decades, village residents have been concerned about on-going erosion of their island. Historically, state and federal government agencies have responded by investing in shoreline protection, which has provided a barrier for the community (TetraTech, 2004).

In the last decade, autumn storms have increased in their intensity, and storm surges from the Chukchi Sea have endangered their community. During the same time period, residents have also documented that the freeze-up of the Chukchi Sea is occurring more than three weeks later, in mid-November instead of late October (Hufford et. al.). In 2002, residents documented that the sea did not freeze until the end of December (Hufford et. al.). Since 2002, Shishmaref has witnessed increasing winter temperatures coupled with thawing permafrost and intense autumn storms. In February 2006, the

community documented open water in the Chukchi Sea, an event that had never been witnessed by any resident of their community prior to that time (Weyiouanna Sr., 2007).

Erosion control is no longer providing protection during the autumnal storm season. Most historical records point to October 1997 as the beginning of the current erosion crisis. At that time, an autumn storm caused severe erosion and required 14 homes and the National Guard Armory to be relocated (TetraTech, 2004; US Army Corps of Engineers, 2006). Severe autumn storms since 2002 have threatened homes, power facilities and other critical village infrastructure (TetraTech, 2004).

In 2002, the Native Village of Shishmaref created a relocation and erosion coalition (Weyiouanna Sr., 2007). In July 2002, residents voted to relocate the community (Weyiouanna Sr., 2007). Several federal government agencies have studied the erosion and relocation issue since 2002, but the actual relocation of the community has not yet started (TetraTech, 2004). The tribal government of Shishmaref believes that their community must relocate by 2012 (Weyiouanna Sr., 2007).

A.4 Traditional Governance Structures Will Not Protect Communities

In Alaska, government agencies have slowly recognised that the traditional adaptation strategies of erosion control and flood relief will not protect communities, and that the traditional governance structures that provide disaster relief are not adequate to respond to the complex humanitarian emergencies facing Alaskan communities. Several reports have been published since 2003 documenting the enormity of the problem. In addition, since the summer of 2007, government officials have organised numerous

public hearings to gather testimony and to begin to implement a new governance structure.

In 2003, the United States Congress authorised a federal agency to analyse the extent of the erosion problem affecting Alaskan communities (United States General Accounting Office, 2003). The report documented that erosion and flooding are affecting 184 of 213 communities, nine of these communities were physically threatened and four of these nine communities are in imminent danger of loss of life and property (United States General Accounting Office, 2003). Shishmaref, Kivalina and Newtok were three of the communities listed that are in imminent danger because of erosion and flooding.

Subsequently, Congressional legislation authorised a second report to conduct a more comprehensive assessment of the nine communities identified in the 2003 report. The 2006 Alaska Village Erosion Technical Assistance Program report evaluated the different costs associated with erosion control versus relocation (US Army Corps of Engineers, 2006). Although the report primarily focused on the different costs associated with each adaptation strategy, the report also identified a number of critical governance issues that need to be addressed, if relocation occurs. The report recognised that no government agency has the authority to relocate communities and that no funding is specifically designated for relocation (US Army Corps of Engineers, 2006). In addition, no criteria exist to choose a relocation site. Most importantly, the report recognised that no governmental organisation exists that can address the strategic planning needs of relocation and the logistics of decommissioning the original community location,

including hazardous waste clean-up and preservation of cultural sites (US Army Corps of Engineers, 2006).

In 2007, the Governor of Alaska created the Alaska Climate Change Sub-Cabinet to implement a climate change strategy for the state. The Immediate Action Workgroup is one of the advisory groups to the Sub-Cabinet and was tasked with identifying the short term emergency steps that state government must take to prevent loss of life and property due to climate change in the communities that must relocate. A state and federal government representative are co-chairs of the Workgroup (Black and Opheen, 2008). The multi-level governance structure of the advisory group is unique. In April 2008, the Workgroup issued its recommendations to the Governor and made numerous recommendations to address the immediate humanitarian needs of the communities forced to relocate (Black and Opheen, 2008).

Erosion control and community evacuation plans are central to the recommendations. The Workgroup also recommended that funding be allocated to communities to begin a relocation planning process. The Workgroup recognised the complex governance issues identified in the 2006 Alaska Village Erosion Technical Assistance Program report and recommended that one state agency leads the relocation effort and acts as the coordinating agency with responsibility of maintaining federal, state and tribal partnerships (Black and Opheen, 2008). The report, however, does not detail the governance structure or jurisdictional authority that will allow the agencies to work together.

The Newtok Planning Group continues to be the only multi-level interdisciplinary governmental workgroup in Alaska focused on relocation. The state planner facilitating the workgroup is coordinating the work of the dozens of agencies involved with Newtok's relocation. She has no jurisdiction to require other agencies to join in her relocation efforts, but federal and state agencies are working with the Newtok Traditional Council and willingly engaging in the relocation process. The Newtok Traditional Council is a small local tribal government that has limited capacity to coordinate the relocation work of dozens of federal and state agencies and administer and obtain funding needed for the relocation process.

The unanswered question is whether the organisational structure of the Newtok Planning Group will be replicated for the other communities that need to relocate without specific legislative authority. None of the agencies participating in the Newtok Planning Group have a funded mandate to relocate communities endangered by climate change. Several agencies are bound by legal guidelines that have created barriers to Newtok's relocation effort. State agencies, such as the Alaska Department of Transportation designated with the task of building airstrips and the Alaska Department of Education designated with building schools, are unable to move forward with these projects at the relocation sites because the regulations require that an existing community with a minimum population be at the site where this infrastructure is built.

In addition, there is no dedicated funding source for relocation and no lead agency designated with creating a statewide relocation strategic plan and coordinating the various agencies working on housing, transportation, community infrastructure,

education, health and related socio-economic needs. There is also no strategic plan for cleaning up and securing the old village sites, so that they can be abandoned without creating an environmental hazard. These governance issues must be addressed and resolved in order to ensure that the communities being forced to migrate because of climate change are protected.

A.5 Creating New Governance Structures

Climigration requires new and unique institutional responses. Communities, rather than individuals or households, will be forced to permanently migrate. Permanent relocation will be mandated, because there will be no ability to return home, since home will be under water or sinking in thawing permafrost.

The relocation of communities will require new multi-level interdisciplinary governance structures to address the complexity of issues that arise when a community is forced to migrate due to climate change. Human rights doctrine must guide the creation of new institutional frameworks. Refugee law, the Universal Declaration of Human Rights, the Guiding Principles on Internal Displacement and the recently adopted Universal Declaration on the Rights of Indigenous Peoples provide a theoretical basis for creating these principles. However, none of these legal documents address the complex crises of populations facing climigration. International human rights principles need to be specifically created for climigration to ensure that the human rights of those forced to migrate because of climate change are protected.

In addition, the work of the United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA) and the World Bank's Involuntary Resettlement policies and procedures can provide operational guidance to governments faced with relocations caused by climate change. The UN OCHA office coordinates multi-level governance structures to provide humanitarian assistance in complex emergencies. OCHA recognizes that there are two different types of field coordination mechanism, strategic and operational (OCHA 1999b: 22). Strategic coordination involves the creation of the overall plan to guide the humanitarian relief effort, the allocation of responsibilities amongst the disparate international, national and local agencies, monitoring the humanitarian relief effort and mobilizing and allocating resources (OCHA 1999b). Operational coordination involves the coordination of specific sectors of the humanitarian assistance. This type of cross-scale interdisciplinary governmental coordination will be essential when responding to the needs of communities forced to migrate because of climate change.

The World Bank has expertise in the resettlement of communities when governments undertake development projects (World Bank, 2004). The procedures developed by the World Bank in response to the social, cultural, economic and political challenges of resettlement also provide important information to communities and governments faced with relocation due to climate change. The guidance provided by the World Bank will be critical in order to avoid the impoverishment and social disintegration that has historically plagued the involuntary resettlement of communities because of government-sponsored development projects.

A.6 Conclusion

Climate change is forcing communities to migrate. Human migration because of climate change will present one of the most severe challenges to governments tasked with providing humanitarian assistance and protection. Alaskan indigenous communities are at the forefront of this global humanitarian crisis. Traditional governance structures will be inadequate to respond to the needs of those forced to migrate. The international community must create guidelines, based in human rights doctrine, for national and local governments to ensure that the human rights of those forced to migrate because of climate change are protected.

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APPENDIX B

FORCED MIGRATION OF ALASKAN INDIGENOUS COMMUNITIES DUE TO CLIMATE CHANGE: CREATING A HUMAN RIGHTS RESPONSE*

B.1 ABSTRACT

Forced migration due to climate change will present one of the most severe challenges to resilience capacity for the communities forced to migrate as well as for local and national governments. The Intergovernmental Panel on Climate Change has identified the regions of the world most vulnerable to climate change and predicts that 150 million people will be displaced by 2050. Erosion, flooding and sea level rise will be the primary causes of displacement. This paper provides empirical research involving three indigenous communities in Alaska forced to migrate because of climate change and describes the tremendous challenges faced by government agencies tasked with providing humanitarian assistance and protection.

Key Words: Migration, Climate Change, Indigenous, Alaska

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B.2 INTRODUCTION

In the Arctic, climate change is evident and occurring at a faster rate than other parts of the planet. The 2007 physical science report of the Intergovernmental Panel on Climate Change (IPCC 2007) confirms that temperature changes in the Arctic have increased by approximately twice the global average between 1965 and 2005. (IPCC 2007: 339) Since1975, temperatures in Alaska have increased an average of 2 to 3.5 degrees Celsius. In addition, arctic sea ice is decreasing in extent and thickness, wildfires are increasing in size and frequency and permafrost is thawing. These ecological phenomena are creating a humanitarian crisis for the indigenous communities that have inhabited the arctic and boreal forest for millennia. Approximately 200 indigenous villages are located along the navigable waters of Alaska's coasts and rivers. Dozens of these communities are threatened because of accelerated rates of erosion or flooding due to climate change. Governments are struggling to respond. The traditional adaptation strategies of hazard prevention and disaster relief are no longer protecting communities. Relocation of the communities is required.

This paper adds to the body of research focused on defining the nexus between climate change and human migration. The empirical research discussed in this paper identifies a migration typology, permanent relocation, which specifically links climate change with human migration and demonstrates that new institutions need to be created in order to protect the human rights of those forced to migrate and prevent humanitarian crises. An accurate definition of this displacement category is essential in order to ensure that the permanent relocation of communities only occurs when there are no other

durable solutions. A precise definition is also critical to the design and implementation of institutional frameworks of humanitarian response. This institutional framework needs to be based in human rights doctrine and created at the local, national and international level.

B.3 Identifying the Nexus Between Climate Change and Human Migration

Climate change will create disparate environmental impacts that force people and communities to migrate. Erosion, flooding, and sea level rise will be the primary causes of displacement. Water and food security issues, due to drought and salt water intrusion, will also impact the sustainability of communities and cause migration.

The disparate drivers of climate-induced migration can be segregated into three distinct categories: random extreme weather events, such as hurricanes and tornadoes, the depletion of ecosystem services, such as drought and salt water intrusion, and on-going ecological changes caused by the combination of random extreme weather events and depletion of ecosystem services that severely impact public infrastructure, such as health clinics and schools, as well as the livelihoods and lives of the people residing in the community.

These climate change drivers cause distinct patterns of human migration. The three migration typologies are: the migration of individuals and households where climate change is one of several factors causing migration, mass migration where entire communities are forced to temporarily evacuate and mass migration where entire communities are forced to permanently relocate. Each migration typology requires a

distinct institutional adaptation strategy to ensure that the humanitarian response is appropriate and that people's human rights are protected.

Research has primarily focused on the first migration typology and has documented the difficulty in demonstrating the nexus between climate change and migration. These studies primarily focus on the depletion of ecosystem services as the primary climate change factor that causes the migration of individuals and households. Some of the studies do not distinguish between ecosystem depletion caused by human overuse of resources and ecosystem depletion caused by climatic events, such as drought (Hugo, 1996; Morales, 2008). This distinction is critical when implementing institutional adaptation strategies.

Socio-economic factors create the difficulty in isolating climate or environment as a significant or exclusive factor that causes migration. In Leighton's (2008) survey of desertification and drought related migration, population growth, household income, social networks and employment opportunities intertwine with climate factors as the causes for migration. Migration is seen as one of many coping strategies to alleviate poverty.

In the recent International Organization for Migration publication, "Climate Change and Migration: Improving Methodologies to Estimate Flows", the authors review several case studies which analyze the connection between drought and migration. These studies focus on the consequences of ecosystem depletion on livelihood decisions and primarily analyze the decision-making process of individuals and households to assess

the likelihood of migration. The research affirms that a multiplicity of socio-economic factors, along with climate change, push people to migrate (Kniveton et. al., 2008).

Similarly, Hugo (1996) argues that climatic causes of migration are difficult to segregate from the "pre-disposing" socio-economic factors such as population density, poverty and resource use (Hugo, 1996). Although his research did not distinguish between ecosystem degradation caused by human overuse of resources and ecosystem depletion caused by climate change, his analysis reveals the difficulty in defining the nexus between migration and climate change when ecosystem depletion is the climate change factor driving the migration.

The IOM climate change and migration study (2008) also examines the mass population displacement caused by random environmental events, where communities are temporarily evacuated and infrastructure is rebuilt with the expectation that people will return home. In this context as well, research has focused on the migration patterns of individuals or households who choose not to return home. In some of these studies, researchers identified socioeconomic status as a factor that contributes to the migration decision and demonstrated again the difficulty of segregating climate from other reasons that cause people to migrate (Kniveton et. al., 2008).

The focus of this paper is on the third migration typology, permanent relocation caused by an on-going depletion of eco-system services created by consistent extreme weather events or climate-induced change such as sea level rise. Climigration is the word that best describes this type of human migration. Climigration occurs when a community is no longer sustainable exclusively because of climate-related events and permanent

relocation is required to protect people. The critical elements of this migration typology are that climatic events are on-going and repeatedly impact public infrastructure and threaten people's safety so that loss of life is possible. This type of human migration is occurring in Alaska. Catastrophic random environmental events, such as tornadoes and hurricanes, do not cause climigration. However, these random environmental events, if on-going, may alter ecosystem services permanently, cause extensive damage to public infrastructure, repeatedly place people in danger and require communities to relocate.

B.4 Climate-Induced Migration in Alaska

Erosion and flooding have plagued the hundreds of indigenous villages that are located along the coast and rivers of Alaska for decades. These communities rely on easy access to navigable waters to hunt marine mammals and fish in order to subsist. Subsistence is central to their culture and survival. Arctic sea ice and frozen tundra are essential ecosystem services. Arctic sea ice has, in the past, protected communities from coastal erosion and flooding by creating a barrier to storm-related waves and surges. Along the northwestern Alaskan coast permafrost, permanently frozen subsoil, is continuous and the glue that keeps the land intact and habitable.

Climate change is depleting these ecosystem services and accelerating the rates of erosion. The complex interplay of ecological feedback loops is now endangering the lives of the inhabitants of these communities. As Mark Serreze, senior snow and ice scientist in Boulder Colorado stated in a newspaper interview in December 2007, "The Arctic is screaming." (Borenstein, 2007). Temperatures along the northern Alaskan coast

have increased an average of 3.5 degrees Celsius during the winter since 1975 (Shulski et. al., 2007:134). These warming temperatures are causing the permafrost to thaw and the Bering and Chukchi Seas to freeze later in the autumn. The 2007 IPCC physical science report has documented that the temperature of the top layer of permafrost has increased by up to 3 degrees Celsius since the 1980s (IPCC, 2007).

At the same time, arctic sea ice is decreasing in thickness and extent. Recent research predicts that the North Pole has a 50% chance of being ice-free during the summer of 2008 (Borenstein, 2008). Record minimum levels of arctic sea ice have been recorded since 2002. The decrease in extent of arctic sea ice coupled with warming temperatures has caused a delay in freezing of the Bering and Chukchi Seas. Near shore pack ice has historically provide a protective barrier to coastal communities. Research has documented that since the 1980s, the arctic seas are remaining ice-free approximately two months longer in the autumn (US Corps of Engineers, 2006). The delay in freezing of the arctic seas has left many communities exposed to the autumnal storms that originate in the Pacific and occur primarily between August and early December. Bering Sea storms are not hurricanes but do have hurricane strength in the damage they can cause on the coast due to wave action and storm surges (Atkinson, 2007). The loss of arctic sea ice coupled with thawing permafrost is causing severe erosion and storm surges that is threatening the lives of the inhabitants of several communities.

Five indigenous communities, located along the western outer coast of Alaska on the Bering and Chukchi Seas, have concluded that relocation is the only durable solution to the climatic events that are threatening their lives. These communities are witnessing

dramatic climate shifts that are impacting community infrastructure as well as the safety of the people who reside within each community. Government agencies recognize that each of these communities is imminently threatened by erosion and flooding and are struggling to meet the enormous new needs of these communities. Up until 2006, local, state and federal government agencies have responded within the context of disaster relief. Millions of dollars have been spent on shoreline protection and consulting firms to study the issue of erosion and relocation. Government agencies now realize that erosion control, the traditional disaster relief response, is a short-term solution and no longer able to protect the inhabitants of these coastal communities. In 2006, a United States government report found that a catastrophic climatic event could submerge three of these communities within 10-15 years of the report's publication.

This paper focuses on three communities identified in the 2006 US government report. The tribal governments of Newtok, Shishmaref and Kivalina recognized several years ago that relocation was the only durable solution that would protect their respective communities. Each community has been engaged for years in an ad hoc process to secure state and federal government assistance in their relocation efforts. The residents of each community have voted and decided that their preferred relocation alternative is to move to a new site and recreate their community. Each community has commissioned several studies to engage in a socio-ecological assessment and evaluate the relocation process. All studies demonstrate the complexity of the issues each community faces if relocation occurs. The impact of the cultural, social, economic and psychological displacement is incalculable.

B.4.1 Newtok

Newtok is a traditional Yu'pik Eskimo village located along the Ninglick River near the Bering Sea. The village site is within the Yukon-Kuskokwim Delta, one of the largest river deltas in the world, and surrounded by marshy tundra and thousands of lakes (Cox, 2007). The people of Newtok are known as "Qaluyaarmiut" or "dip net people" whose ancestors have inhabited the Bering Sea coast for at least 2000 years (ASCG, 2004). According to the 2000 Census, 321 people reside in the community (ASCG, 2004). The only access to the community is by barge during the summer or airplane.

Newtok has made the most progress in its relocation efforts. In 2003, the Newtok Native Corporation secured land ownership to a relocation site through a legislative act of the United States Congress. The new community is located nine miles south of Newtok across the Ninglick River and has been named Metarvik, which in Yu'pik means "getting water from the spring" (Cox, 2007).

The change of the Ninglick River course is causing severe erosion of the river bank adjacent to the village. Climate change is impacting the rate of erosion, which is caused by a combination of increased temperatures, thawing permafrost, wave action and river current (Cox, 2007). Erosion, flooding and salt water intrusion are threatening the community. Critical public infrastructure is being washed away (Cox, 2007). The barge landing, which provides summer access to the community for supplies and fuel for heating, no longer exists and is causing a fuel crisis. Salt water is affecting the potable

water. Community inhabitants are experiencing mental and physical health issues associated with the decline of ecosystem services, such as potable water (Cox, 2007).

The community has monitored the erosion rates of the Ninglick River for decades. In 1994, the Newtok Traditional Council started a relocation planning process and analyzed relocation to six potential village relocation sites. The Newtok Traditional Council also considered relocation to three already existing villages with residents of Newtok being dispersed between them (ASCG, 2004). Ten years later, the Newtok Traditional Council commissioned a report to provide background documentation to government agencies and officials to justify the efforts of the village to relocate and to support requests for government assistance in this process (ASCG, 2004).

In 2006, an Alaska state agency created the Newtok Planning Group to specifically address the short-term emergency needs of the community and to begin a relocation planning effort. Approximately twenty-five different tribal, state and federal government representatives participate in the Newtok Planning Group (Cox, 2007:13). The state agency coordinates their work, but has no dedicated funding to relocate the community and no jurisdictional authority to require other agencies to perform work needed for the relocation. For these reasons, the Newtok Planning Group has encountered numerous hurdles that have slowed their progress.

The Newtok Traditional Council built three homes at their new village site, Metarvik, last summer. This summer the Newtok Planning Group is building a barge landing at Metarvik (Cox, 2007: 13-18). The tribal government believes that their village must be relocated by 2012 to avoid a greater humanitarian crisis.

B.4.2 Kivalina

Kivalina is an Inupiaq Eskimo village located on a barrier island in the Chukchi Sea approximately 80 miles above the Arctic Circle. Residents of Kivalina have lived at this location for at least 150 years. Approximately 360 people currently live in Kivalina (Swan, 2007a). Subsistence is the lifeblood of the community. The Native Village of Kivalina, a federally recognized indigenous tribe, has been working on its village's relocation for several decades (Swan, 2007b). Erosion has historically been a concern for the community. In 1963, the Native Village of Kivalina voted on relocation but a majority of residents did not want to move so the community remained in its present location (Swan, 2007a). In 1998, the community voted a second time on the relocation issue and decided to relocate. The community chose a relocation site (Swan, 2007a). Federal government agencies later determined that the chosen site was unsuitable for community development because of permafrost (Tryck et. al., 2006). The community voted on relocation a third time in 2000 and chose a different relocation site (Swan, 2007a). Despite this 2000 vote, the community has not begun to relocate because federal government agencies believe that the second site chosen by the community is also unsuitable for relocation (Swan, 2007a).

At the present time, erosion is causing multiple harms to the community, including loss of critical public infrastructure and transportation access to the community. Air and sea are the only two methods of access to the community. The silt build-up from erosion is affecting summer barge access to Kivalina and erosion caused by sea storm

surges is impacting the community's airstrip. In addition, private homes have had to be relocated into the interior of the barrier island (Tryck et. al., 2006: 6). Erosion is also threatening the stability of the solid waste storage containment area on the island, which could create an environmental catastrophe to the surrounding bodies of water (Tryck et. al., 2006:5-6).

Erosion control continues to be the primary focus of government assistance. In September 2006, federal government leaders arrived in Kivalina to celebrate the finalization of a multi-million dollar seawall. Prior to the commencement of celebrations, a storm damaged 160 feet of an 1800 foot seawall and caused the officials to cancel the celebration (deMarban, 2006). One year later, in September 2007, a storm once again threatened the community and its residents feared that the seawall would not provide them with protection. 250 Kivalina residents evacuated their community in search of safety (Bragg, 2007).

Recent state funding has been allocated to start a relocation planning process. The community believes that they must be relocated within the next five years to prevent a greater humanitarian crisis (Black et. al., 2008).

B.4.3 Shishmaref

Shishmaref is a traditional Inupiat Eskimo community located on Sarichef Island on the northwest coast of Alaska. The barrier island separates the Chukchi Sea from a saltwater lagoon on the leeward side of the island. The residents of Shishmaref have lived on the island for several centuries and actively subsist (Weyiouanna, 2007). Access

to the ocean is essential to their survival. For several decades, village residents have been concerned about on-going erosion of their island. Historically, state and federal government agencies have responded by investing in shoreline protection, which has provided a barrier for the community (TetraTech, 2004).

In the last decade, autumn storms have increased in their intensity and storm surges from the Chukchi Sea have endangered their community. During the same time period, residents have also documented that the freeze-up of the Chukchi Sea is occurring more than three weeks later, in mid-November instead of late October (Hufford et. al.). In 2002, residents documented that the sea did not freeze until the end of December (Hufford et. al.). Since 2002, Shishmaref has witnessed increasing winter temperatures coupled with thawing permafrost and intense autumn storms. In February 2006, the community documented open water in the Chukchi Sea, an event that had never been witnessed by any resident of their community prior to that time (Weyiouanna Sr., 2007).

Erosion control is no longer providing protection during the autumnal storm season. Most historical records point to October 1997 as the beginning of the current erosion crisis. At that time an autumn storm caused severe erosion and required 14 homes and the National Guard Armory to be relocated (TetraTech, 2004; US Army Corps of Engineers, 2006). Severe autumn storms since 2002 have threatened homes, power facilities and other critical village infrastructure (TetraTech, 2004).

In 2002, the Native Village of Shishmaref created a relocation and erosion coalition (Weyiouanna Sr., 2007). In July 2002, residents voted to relocate the community (Weyiouanna Sr., 2007). Several federal government agencies have studied

the erosion and relocation issue since 2002, but the actual relocation of the community has not yet started (TetraTech, 2004). The tribal government of Shishmaref believes that their community must relocate by 2012 (Weyiouanna Sr., 2007).

B.5 Traditional Governance Structures Will Not Protect Communities

In Alaska, government agencies have slowly recognized that the traditional adaptation strategies of erosion control and flood relief will not protect communities and that the traditional governance structures that provide disaster relief are not adequate to respond to the complex humanitarian emergencies facing Alaskan communities. Several reports have been published since 2003 documenting the enormity of the problem. In addition, since the summer of 2007, government officials have organized numerous public hearings to gather testimony and to begin to implement a new governance structure.

In 2003, the United States Congress authorized a federal agency to analyze the extent of the erosion problem affecting Alaskan communities (GAO, 2003). The report documented that erosion and flooding are affecting 184 of 213 communities, nine of these communities were physically threatened and four of these nine communities are in imminent danger of loss of life and property (GAO, 2003). Shishmaref, Kivalina and Newtok were three of the communities listed that are in imminent danger because of erosion and flooding.

Subsequently, Congressional legislation authorized a second report to conduct a more comprehensive assessment of the nine communities identified in the 2003 report.

The 2006 Alaska Village Erosion Technical Assistance Program report evaluated the different costs associated with erosion control versus relocation (US Army Corps of Engineers, 2006). Although the report primarily focused on the different costs associated with each adaptation strategy, the report also identified a number of critical governance issues that need to be addressed if relocation occurs. The report recognized that no government agency has the authority to relocate communities and that no funding is specifically designated for relocation (US Army Corps of Engineers, 2006). In addition, no criteria exist to choose a relocation site. Most importantly, the report recognized that no governmental organization exists that can address the strategic planning needs of relocation and the logistics of decommissioning the original community location, including hazardous waste clean-up and preservation of cultural sites (US Army Corps of Engineers, 2006).

In 2007, the Governor of Alaska created the Alaska Climate Change Sub-Cabinet (Sub-Cabinet) to implement a climate change strategy for the state. The Immediate Action Workgroup (Workgroup) is one of the advisory groups to the Sub-Cabinet and was tasked with identifying the short term emergency steps that state government must take to prevent loss of life and property due to climate change in the communities that must relocate. A state and federal government representative are co-chairs of the Workgroup (Black et. al., 2008). The multi-level governance structure of the advisory group is unique. In April 2008, the Workgroup issued its recommendations to the Governor and made numerous recommendations to address the immediate humanitarian needs of the communities forced to relocate (Black et. al., 2008).

Erosion control and community evacuation plans are central to the recommendations. The Workgroup also recommended that funding be allocated to communities to begin a relocation planning process. The Workgroup recognized the complex governance issues identified in the 2006 Alaska Village Erosion Technical Assistance Program report and recommended that one state agency lead the relocation effort and act as the coordinating agency with responsibility of maintaining federal, state and tribal partnerships (Black et. al., 2008). The report, however, does not detail the governance structure or jurisdictional authority that will allow the agencies to work together.

The Newtok Planning Group continues to be the only multi-level interdisciplinary governmental workgroup in Alaska focused on relocation. The state planner facilitating the workgroup is coordinating the work of the dozens of agencies involved with Newtok's relocation. She has no jurisdiction to require other agencies to join in her relocation efforts, but federal and state agencies are working with the Newtok Traditional Council and willingly engaging in the relocation process. The Newtok Traditional Council is a small local tribal government that has limited capacity to coordinate the relocation work of dozens of federal and state agencies and administer and obtain funding needed for the relocation process.

The unanswered question is whether the organizational structure of the Newtok Planning Group will be replicated for the other communities that need to relocate without specific legislative authority. None of the agencies participating in the Newtok Planning Group have a funded mandate to relocate communities endangered by climate change.

Several agencies are bound by legal guidelines that have created barriers to Newtok's relocation effort. State agencies, such as the Alaska Department of Transportation designated with the task of building airstrips and the Alaska Department of Education designated with building schools, are unable to move forward with these projects at the relocation sites because the regulations require that an existing community with a minimum population be at the site where this infrastructure is built.

In addition, there is no dedicated funding source for relocation and no lead agency designated with creating a statewide relocation strategic plan and coordinating the various agencies working on housing, transportation, community infrastructure, education, health and related socio-economic needs. There is also no strategic plan for cleaning up and securing the old village sites so that they can be abandoned without creating an environmental hazard. These governance issues must be addressed and resolved in order to ensure that the communities being forced to migrate because of climate change are protected.

B.6 Creating New Governance Structures

Climigration requires new and unique institutional responses. Communities, rather than individuals or households, will be forced to permanently migrate. Permanent relocation will be mandated because there will be no ability to return home because home will be under water or sinking in thawing permafrost.

The relocation of communities will require new multi-level interdisciplinary governance structures to address the complexity of issues that arise when a community is

forced to migrate due to climate change. Human rights doctrine must guide the creation of new institutional frameworks. Refugee law, the Universal Declaration of Human Rights, the Guiding Principles on Internal Displacement and the recently adopted Universal Declaration on the Rights of Indigenous Peoples provide a theoretical basis for creating these principles. However, none of these legal documents address the complex crises of populations facing climigration. International human rights principles need to be specifically created for climigration to ensure that the human rights of those forced to migrate because of climate change are protected.

In addition, the work of the United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA) and the World Bank's Involuntary Resettlement policies and procedures can provide operational guidance to governments faced with relocations caused by climate change. The UN OCHA office coordinates multi-level governance structures to provide humanitarian assistance in complex emergencies. OCHA recognizes that there are two different types of field coordination mechanisms, strategic and operational (OCHA 1999: 22). Strategic coordination involves the creation of the overall plan to guide the humanitarian relief effort, the allocation of responsibilities amongst the disparate international, national and local agencies, monitoring the humanitarian relief effort and mobilizing and allocating resources (OCHA 1999: 22). Operational coordination involves the coordination of specific sectors of the humanitarian assistance. This type of cross-scale interdisciplinary governmental coordination will be essential when responding to the needs of communities forced to migrate because of climate change.

The World Bank has expertise in the resettlement of communities when governments undertake development projects (World Bank, 2004). The procedures developed by the World Bank in response to the social, cultural, economic and political challenges of resettlement also provide important information to communities and governments faced with relocation due to climate change. The guidance provided by the World Bank will be critical in order to avoid the impoverishment and social disintegration that has historically plagued the involuntary resettlement of communities because of government-sponsored development projects.

B.7 Conclusion

Climate change is forcing communities to migrate. Human migration because of climate change will present one of the most severe challenges to governments tasked with providing humanitarian assistance and protection. Alaskan indigenous communities are at the forefront of this global humanitarian crisis. Traditional governance structures will be inadequate to respond to the needs of those forced to migrate. The international community must create guidelines, based in human rights doctrine, for national and local governments to ensure that the human rights of those forced to migrate because of climate change are protected.

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APPENDIX C

PROOF OF RESEARCH APPROVAL

Please note that University of Alaska Fairbanks IRB has taken the following action on IRBNet:

Project Title: [285212-1] Climate-induced community relocations

Principal Investigator: Terry Chapin, PhD

Submission Type: New Project

Date Submitted: November 24, 2011

Action: APPROVED

Effective Date: December 12, 2011

Review Type: Expedited Review

Should you have any questions you may contact Gretchen Hundertmark at ghundertmark@alaska.edu.

Thank you,

The IRBNet Support Team

http://www.irbnet.org/